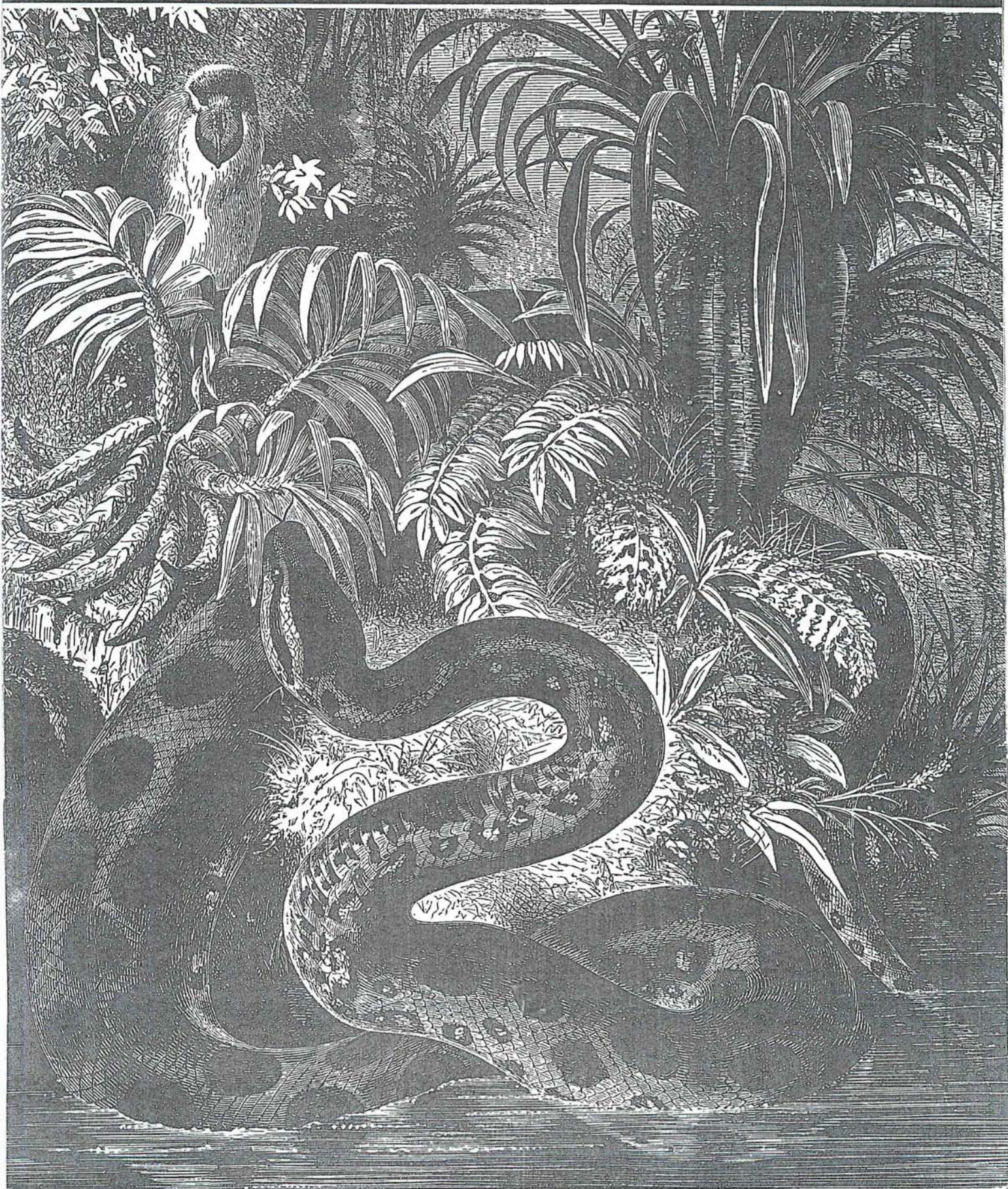
EUROPEAN-EDITION

SOUTH AMERICAN EXPLORER

OCTOBER/'77



The South American Explorers Club

The South American Explorers Club is a non-profit, non-political, non-sectarian association founded in 1977, and headquartered in the municipality of Breña, Lima, Peru for the following purposes:

—To advance and support all forms of scientific field exploration and research in such areas as biology, geography, anthropology, oceanography, archaeology, and related sciences, as well as field sports such as white-water running, hiking, backpacking, mountaineering, caving, and others.

—To receive contributions for the support of legitimate scientific research and exploration that comes within the Club's range of interests.

—To promote programs of an educational, scientific, and cultural nature at Club Headquarters.

—To further the exchange of information between scientists, adventurers, and travellers of all nations with the purpose of encouraging exploration throughout the continent of South America.

—To collect and make available reliable information on all organizations in South America which offer services to travellers, scientists, and outdoorsmen.

—To record and publish research in the natural sciences and documented accounts of adventure/sports.

—To awaken greater interest in and appreciation for wilderness conservation and wildlife protection.

Membership

Membership is open to women and men of all nationalities and all ages, subject to ratification by the Club's executive committee. No professional qualifications are required.

The regular annual membership fee of US$25 (or equivalent in £ Sterling or Peruvian currency) runs one year from the date of application.

Members receive four quarterly issues of the Club's magazine, the *South American Explorer,* reports on expedition opportunities, discounts on Club books, pamphlets, and maps, full use of the Club's information services, library, reading room, and other Club facilities.

Members are not permitted to use the Club or its facilities for commercial purposes or personal gain.

Magazine

The *South American Explorer* is a scientific and educational quarterly published by the South American Explorers Club.

Four issues of the *South American Explorer* are included in the regular US$25 annual membership fee.

Subscription only: one year US$10 plus US$3 for overseas airmail postage.

The *South American Explorer* is interested in receiving readable and accurate accounts of exploration, scientific studies, and adventure/sport activities in and around the continent of South America.

The South American Explorers Club is interested in establishing links with other organizations sharing a common purpose by exchanging technical information, publications, and ideas.

To Our Contributors

The *South American Explorer* desires interesting narrative accounts of expeditionary activities in or around South America and thoughtful or interpretive essays on the subject of exploration. Although we cannot use highly technical research reports, we desire a strong flavor of the scientific objectives and values of the work. Articles describing historical explorations, short biographies of notable South American explorers, and evocative descriptions of unusual places, can also be used. Essentially the *South American Explorer* aspires to be a serious and authoritative source of information about exploration and the field sciences. Editorial requirements sent free on request.

THE SOUTH AMERICAN EXPLORERS CLUB

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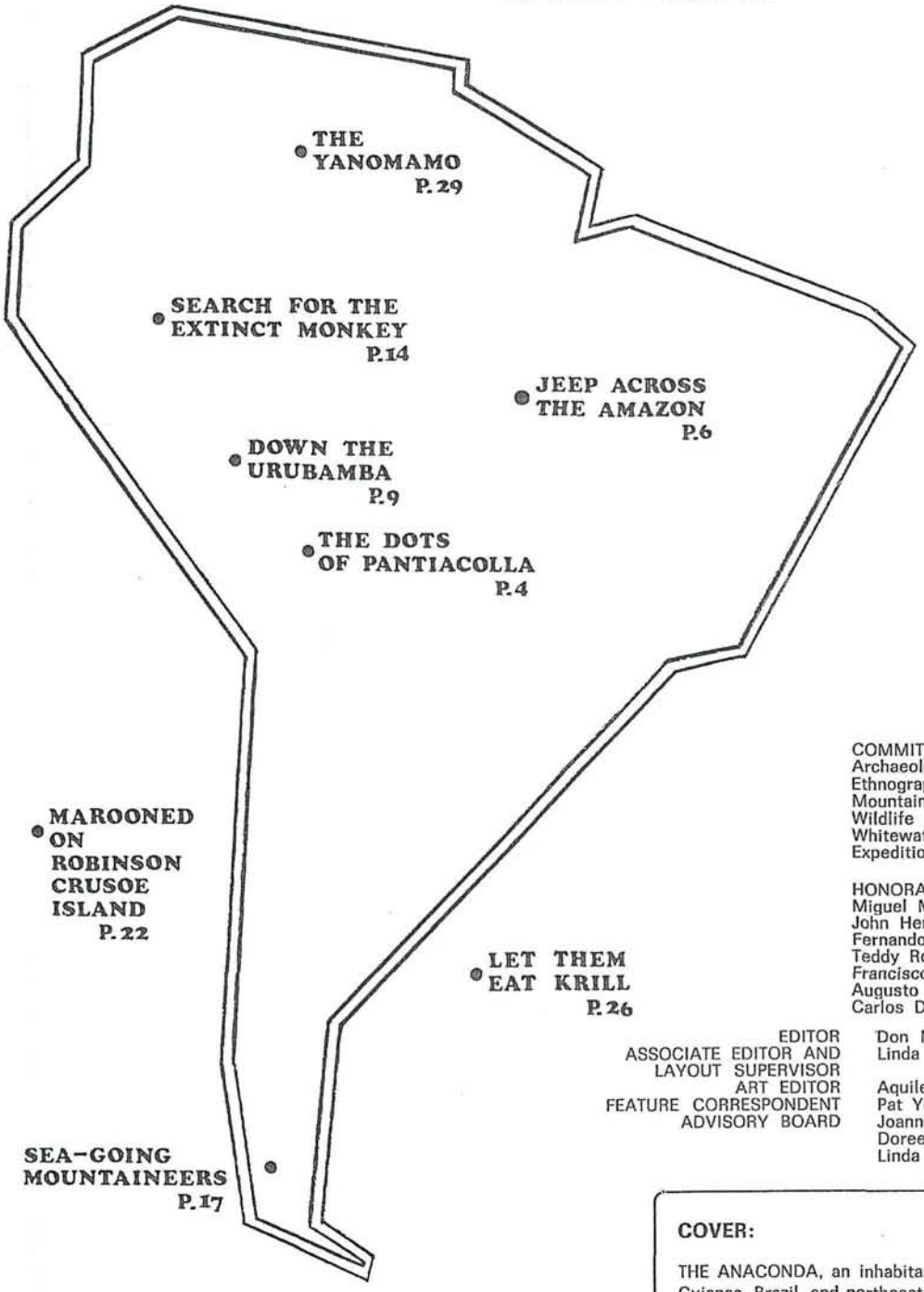
THE YANOMAMO P.29
SEARCH FOR THE EXTINCT MONKEY P.14
JEEP ACROSS THE AMAZON P.6
DOWN THE URUBAMBA P.9
THE DOTS OF PANTIACOLLA P.4
MAROONED ON ROBINSON CRUSOE ISLAND P.22
LET THEM EAT KRILL P.26
SEA-GOING MOUNTAINEERS P.17

And:

BOOKS 30
LETTERS 31
TIPS & NOTES 32
CLASSIFIEDS 33
NO COMMENT 34
NEWS SHORTS 36

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COVER:

THE ANACONDA, an inhabitant of the tropical forest regions of the Guianas, Brazil, and northeastern Peru.

Floating down rivers with the current, lurking in quiet pools, resting on rocks, or hanging on low tree branches, it lies in wait for its prey: mammals (up to half grown sheep in size) and birds.

The anaconda, largest of all living snakes, has been reported to reach 33 feet in length, while if native reports are to be trusted, individuals of much larger size are occasionally encountered.

Engraving by A.E. Brehm, as reproduced in The Royal Natural History, 1894.

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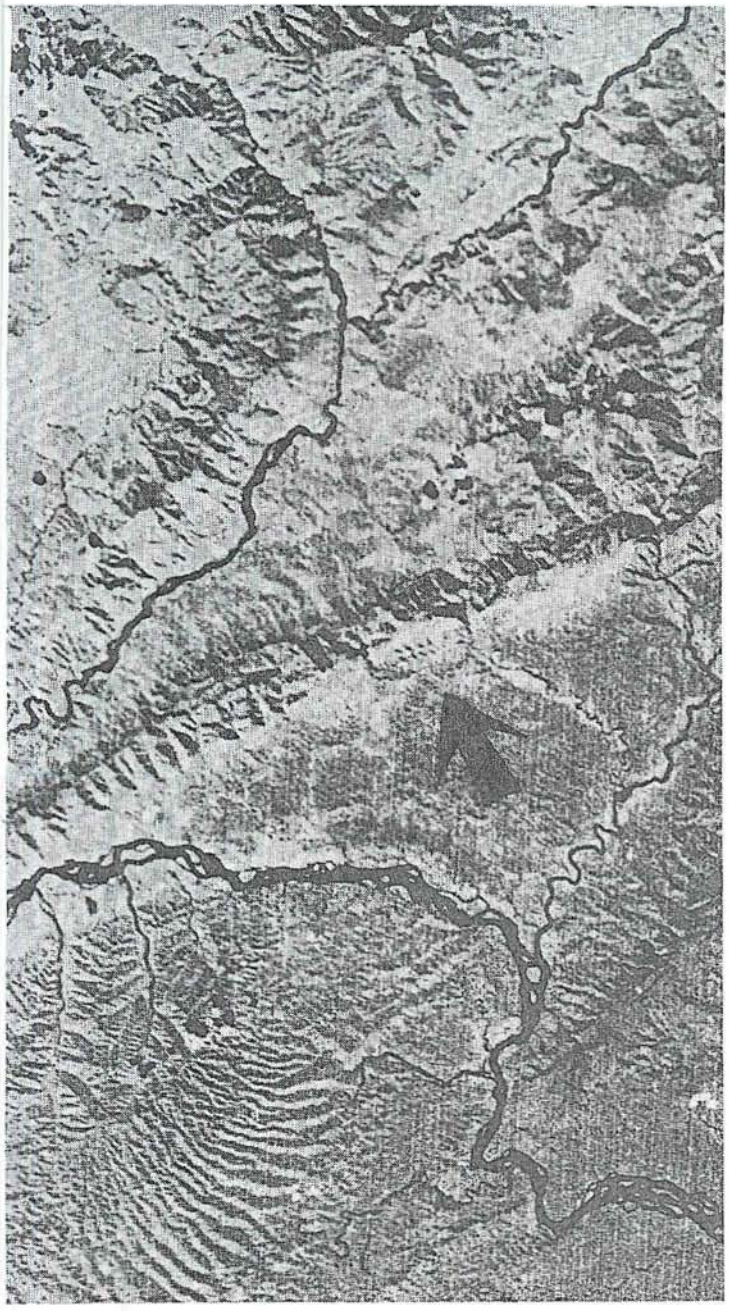


LEFT: Curious dot formation (see arrow) as it appears on NASA satellite photo — scale 150,000:1. RIGHT, OPPOSITE PAGE: Blow-up of this formation. Length of enclosing oval formation 3 kms. BELOW: Photo of petroglyph, located 8 kms. from the dots, with schematic of rock carvings.

The Dots Of Pantiacolla

by Ursula Thiermann

ON December 30, 1975, the sophisticated camera aboard an ERTS satellite, whirling miles above a small section of southeastern Peru at latitude 13° south, snapped photographs on four wavelengths. These photos, along with thousands of others, were beamed to earth and relayed to the giant NASA computer installation in the United States, to be used for a mammoth study of hydrological and agricultural resources. Each photo was numbered, indexed, and filed.

In May 1976, Rodolfo Bragagnini requested copies of several photos of the upper Madre de Dios region of southeastern Peru. He was not, however, looking for water or a better place to grow potatoes. On photograph number C-S11-32W∅71-∅3 he found what he was looking for.

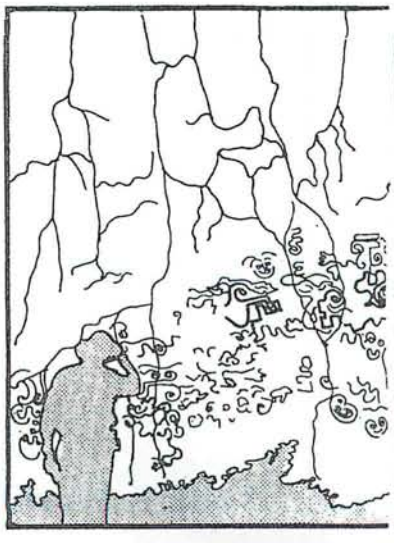
This photograph discloses the presence of an unusual formation at the base of the Pantiacolla Mountains. Reproduced on these pages is the photograph (at a scale roughly 150,000:1) taken on wavelength 7 — a band especially suited for topographic analysis. This wavelength cuts through most of the thick jungle vegetation, and thus, gives a clear black outline of rivers, lakes, and other bodies of water. On the other hand, mountains and rock will reflect light and show up white, outlined by darker shadows.

Located somewhat right of center, near the base of the central mountain range shown in this photo, is an amphitheater-shaped outcropping. The area circumscribed by this eliptical formation encompasses some three square kilometers. Within this oval are ten unexplained dots.

At first glance, the photo seems to show ten black dots. Originally, it was thought that they might be shadowy depressions or possibly water. However, since the dots have shown up on infrared composite photographs as white, like the mountains, this theory was discarded. Also, photo enlargements have revealed these dark areas to be shadows of larger structures, probably stone, measuring 150-200 meters in diameter.

Exactly what they are is not known. The Interamerican Geographic Institute is currently mapping this region. The institute's chief engineer, A.T. Tizando, said after a careful examination of the entire mountain range: "We have never seen anything like this before." It is, of course, possible that they are a mere chance geological formation. Nonetheless, for the moment, several factors argue against this interpretation.

Firstly, no other similar formation has been found on either side of this particular mountain range, and a close study of other mountain ranges has not produced anything that resembles this feature. Secondly, the probability of five pairs of massive rock formations aligning themselves in this fashion is small. Thirdly, the distance between each pair of dots measured vertically seems to be equal. And finally, the location of these dots within the enclosing horseshoe-



shaped embankments at either end and on top of a possibly protective plateau seems curious at least.

None of the above observations is incompatible with a naturally occurring geological formation. But taken together, they would seem to indicate that these dots are man-made.

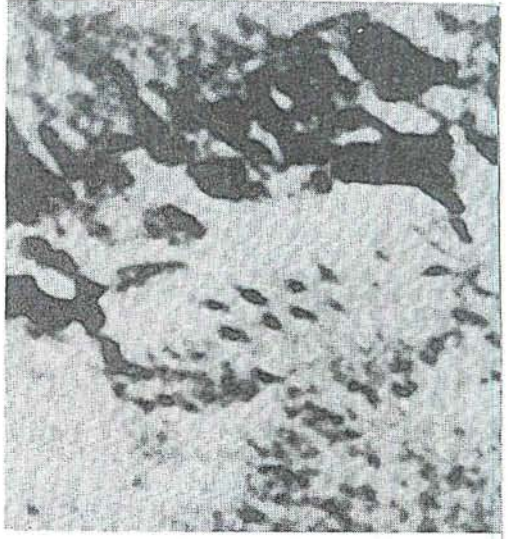
In February 1966, Rodolfo Bragagnini, a graduate engineer from the University of Lima, got together with five other amateur archaeologists to found the Institute for the Investigation of Andean Archaeology (INIARA). Last year, after working out the dimensions of the dots in the NASA photograph and considering that they might represent an undiscovered archaeological site, he offered two startling comparisons for consideration. The entire complex comprises an area three times the size of Machu Picchu. Each dot represents an object only marginally smaller than the Great Pyramid of Cheops in Egypt.

Bragagnini has been interested in this specific region of Peru for many years. Born and raised near Cuzco, he knew that the area abounded in Inca ruins, and that the terrain is some of the most impenetrable in the Peruvian jungle. The density of the overgrowth and the abundance of poisonous snakes makes exploration difficult at best. People have been known to walk over ruins without knowing it. In fact, Bragagnini was nearly killed on one of his early expeditions when he almost stepped unaware off a nine meter cliff overhanging a river.

Bragagnini had two indications from personal experience that this area of the upper Madre de Dios might be important archaeologically. The first was hardly substantial. As a boy, Machiguenga Indians told him of a fabulous fortress within a week's journey of his family's ranch. Years later, as his interest in archaeology grew, he realized that there were many such legends of lost cities. Nevertheless, he knew that there were numerous ruins around his home. He explored the area, turning up ancient reservoirs, an Inca road, and other discoveries. He assumed that the Indian story probably had some grain of truth, though likely blown out of proportion. Still, he thought, Machu Picchu was discovered as the result of legend and as late as 1911.

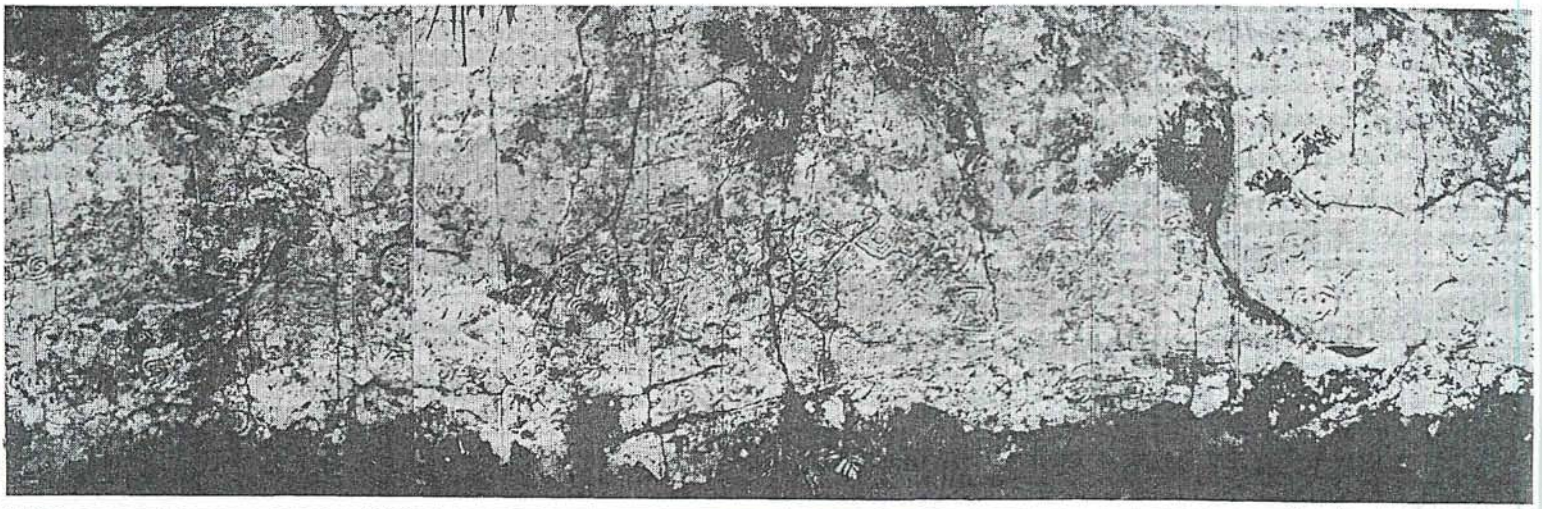
The second clue was more tangible — the discovery of a giant petroglyph (see photo), 4 meters high and 13 meters long. INIARA has confirmed that this petroglyph is within 8 kilometers of the dots. In the photograph, several carved figures can be seen. Faces, animals, and some geometric designs are most obvious. The schematic, drawn at the site, gives a better idea of the complicated markings. The significance and age of the drawings has not been determined.

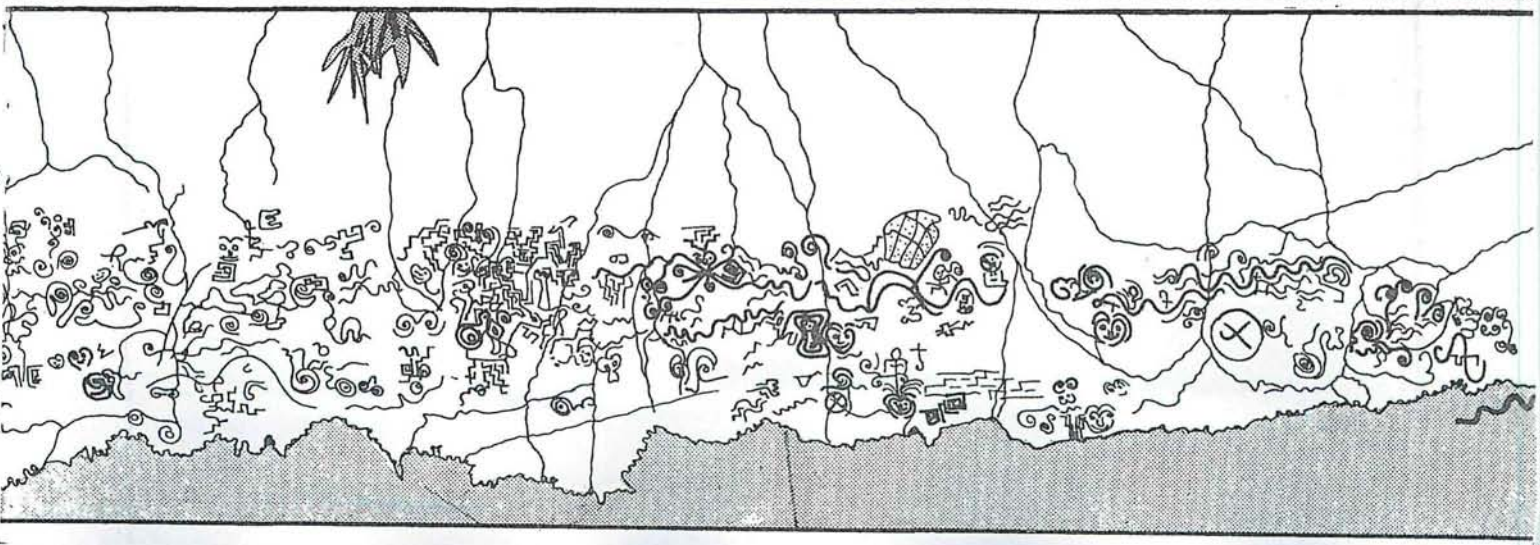
An explanation of the dots will require on-site inspection. The Machiguenga story of a fabulous fortress alone would be interesting, but not merit an expensive scientific expedition. However, when the legend is given some support by space-age technology, coupled with the nearby discovery of a giant petroglyph, the implication is clear. Expert investigation is called for.



INIARA has made preliminary investigations near the area of the dots and came back with some important background information. They feel that the time has come for professional archaeologists and geologists to join the next search. They have tentatively planned a major expedition into this area during June and July 1978. Experts in these fields are invited to submit their credentials.

In summary, the existence of such structures or formations individually the size of the Great Pyramid, collectively three times greater than Machu Picchu, merits attention. If they are massive rock formations, they are unique. If they are, as some investigators believe, traces of a lost civilization, they may be one of the most important archaeological discoveries of the century.





JEEP ACROSS THE AMAZON

PART ONE: PREPARATIONS

by Ana and Bob Cook

PHOTOGRAPHS BY THE AUTHORS

THERE remained a final precaution before we began our trek — put a chain lock on the second spare tire. This was the first time we carried a second spare, but since we were to attempt the first successful land crossing of the formidable Amazon Basin, an extra measure of safety seemed appropriate.

After thirty minutes of careful selection in the hardware store, I returned with $24 worth of latches, chains, and locks, confident that our precious spares would be safe from the most determined of thieves. The final collection of bags, boxes, and camping gear was stacked up in the driveway of our Santa Monica, California home. My wife, Ana, glanced at the impressive array of anti-theft devices, then began laughing. Believing her shaken by the sudden reality of our five year dream, I spoke to her in soothing tones. She just kept laughing and pointed to the top of the Jeep. I saw one lone spare. Its mate had definitely been stolen.

Smiling sheepishly, we shrugged off the loss, and finished loading. That done, we rambled off to our encounter with the Amazon jungle. Later, in South America, we regretted this nonchalance when the lack of a second spare put the expedition and our lives in jeopardy.

TRANS-CONTINENTAL crossings using the popular southern routes were first undertaken in the 1920's. In 1927, Jose Mario Barone made the first such expedition. Starting out in Rio de Janeiro, he drove south, crossed northern Argentina, cut his own road through the altiplanos of Bolivia, then struggled along the llama trails of Peru. He reached Lima six months later. Continuing north to Colombia by land, he shipped his vehicle around parts of Central America, finally arriving in New York in 1929.

A Brazilian engineer, Leonidas Borgas, leading an expedition in 1928, also started from Rio. He crossed directly through the Mato Grosso jungle in southern Brazil by constructing countless bridges and three rafts, on which he ferried the two expedition vehicles over the large rivers. Beset by accidents and a great deal of illness, he managed to reach Peru. Then, like, Barone, he struck north overland. Borgas, however, attempted the difficult crossing of Central America. Here he ran into such problems and hardships that he did not reach Washington, D.C., until 1937 — a full nine years later! Both of these accounts make fascinating reading.

Despite these early epic journeys, the Amazon Basin remained unconquerable because of the denseness and enormity of the jungle. By 1971, the crossing of South America via the Amazon remained the only major trans-continental journey in the world yet to be done. Even the African and Antarctic continents had been traversed by vehicles decades before. The question which gnawed at the back of our minds, even as we turned out of our Santa Monica driveway was: in the face of all the obstacles before us, would it be possible for two relatively naive explorers to succeed without monetary or institutional backing where everyone else had failed?

THIS RATHER curious project was conceived during our honeymoon in Peru in 1971. Although nearly all the advice and

ABOVE: Winching across the Rio Tahuamanu. BELOW: Testing out our Jeep on a dry run in Death Valley, California.

information we received was negative, one item boded well. Brazil was energetically pushing forward with the Trans-Amazon highway. It was projected that by 1974, the highway would stretch from the Atlantic to the Peruvian border. Then in 1973 and 1974, Brazil, due to financial problems, rerouted parts of the Trans-Amazon highway and cancelled the final portion leading to the Peruvian border. Still, this road would simplify the problem considerably, leaving only the very difficult Peruvian jungle to conquer.

But even if such a project were feasible, we doubted our qualifications. We had never ventured by car more than a few hundred miles from our comfortable home. Just to reach the Amazon, we would have to pass through thirteen countries, over roads that varied from excellent to little more than an engineer's passing fancy. Once in the jungle, we would be alone for weeks, perhaps months, with small hope of rescue, no mechanics, and no one to rely upon but ourselves. But we had a dream, and it seemed possible from our secure middle class existence in California.

THERE IS NO formula, no neat equation, when worked out logically will result in the solution of how to drive where no once has driven before.

But for five years we both worked, I, as a statistician; Ana as a nurse. We exercised, and played competitive badminton to keep in shape physically. Mentally, we kept in training by taking courses at UCLA in Spanish, French, photography, writing, and anthropology. In what spare time was left, we did research on the areas we would encounter, built (oftentimes invented) our camping gear, and learned to repair our Jeep. In the few days vacation we allowed ourselves every year, we travelled to the remotest regions of Mexico and the United States, testing our equipment — and ourselves.

From the parched deserts of Mexico, to the mushy tundras of Alaska, we punished every nut and bolt of our 1965 Jeep Wagoneer. Disintegrated would perhaps be a better word. Of the original vehicle, all that survived were the back seat, windshield wipers, two Monroe shock absorbers, and the odometer which registered 169,525 miles when we headed south.

Initially, neither of us knew the difference between a differential and a distributor. Five years and 80,000 miles later, we were competent to open a garage. At a cost of US$14,384.37, our education may seem somewhat expensive, but later it did save our lives. Some of the more expensive items which were completely destroyed, or simply proved unsuitable were: 4 engines, 3 axles, 3 radiators, 2 sets of car seats, 2 differentials, 2 transmissions, a transfer case, and a complete steering assembly.

We attached a second gas tank, bringing our capacity to 70 gallons. Choosing a winch presented an unexpected problem. The most powerful ones are directly coupled to the engine. The extra power they afforded over electric winches was enticing. But after much discussion with other off-the-roaders, we chose a three ton electric which could work off the battery alone. This proved to be a wise decision. Later, in the jungle, we were forced to winch ourselves across deep rivers using only the battery, since the motor was underwater and useless.

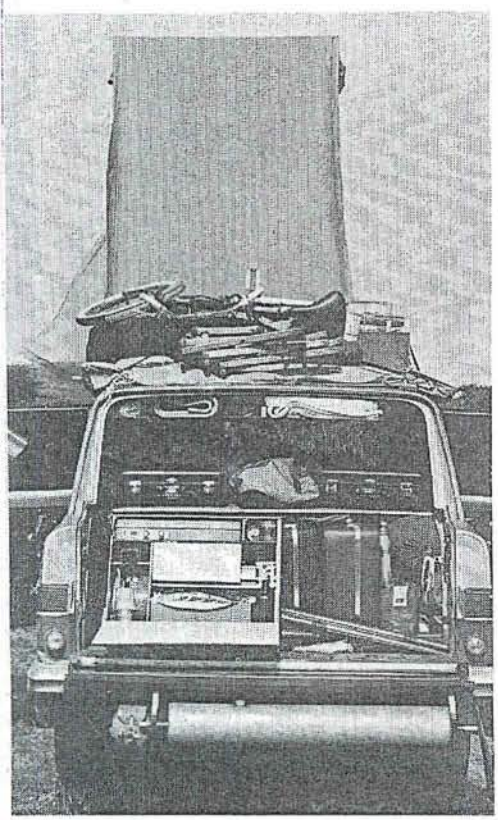
Although an extremely reliable vehicle was essential, our own reliability and comfort would probably determine the outcome of the adventure. We would not be sightseeing from an air-conditioned bus. Still, we felt that adventure was not synonymous with sleeping on banana leaves in mosquito-infested swamps, fighting jaguars bare-handed, or eating raw snakes.

OUR HEALTH came first. Ana is an extremely competent nurse, a specialist in post-coronary care, so we were lucky in that respect. She created a mini-hospital containing all the antibiotics and other medicines to combat the jungle diseases, fungi, stings and bites, and other maladies that awaited us. It wasn't until we were half way through Central America that we discovered she had forgotten Band-Aids, Aspirin, and Alka-Seltzer.

While Ana was concerned with the interior requirements of our bodies, I worried about the exterior, specifically the posterior. The prospect of spending days, weeks, and months bouncing along uneven, pot-holed South American roads did not appeal to our dorsal anatomy. A two year search for orthopedically sound car seats ended with the selection of the Recaro seat imported from Germany by Citroen Motors of Pomona, California. We choked on the $600 price tag, but the investment proved worthwhile in the end.

I solved the problem of horizontal comfort with my own invention. Three years of designing, building, and testing produced a pop-up, cantilevered tent. Mounted on the forward section of the Jeep's roof, this tent, with seven feet of head room, was more than ample for two people. The tent and two storage cabinets, mattress, and sleeping bags could be folded into a box 4 feet square and 9 inches high in thirty seconds.

WE CUT out the door bottoms and attached pockets for additional storage space.



ABOVE: Loaded and ready to go. Pop-up tent on roof, tailgate kitchen. RIGHT: Rotatable five gallon water cylinder attached to rear door.

Although the design of the tent was basically sound, many sleepless nights awaited us. Our North American testing failed to duplicate tropical conditions. First, the tropical storms are far more intense than any in a temperate zone. Second, tropical mosquitoes and other flying pests are not stopped by a simple layer of mosquito netting.

Ana's brother, Aquiles, used his talents as an architect to design a tailgate kitchen. (For details, see "Build a Tailgate Kitchen", August 1977, Van, Pickup, & 4WD Magazine). With a flip of the tailgate latch, we were able to unfurl an environment of culinary bliss. Everything was there — the stove, counter, utensils, food and utilities. Propane gas flowed into the stove from tanks installed in the rear wheel well. Two lights mounted on the roof provided illumination. A rotatable 5 gallon cylinder attached to the tailgate gave easy access to water. If it rained, we could cook under a nylon canopy, which tucked away into a canvas pouch on the roof.

Our original estimate of $20,000 for the two year trip around South America escalated to $30,000 in 1974 after the two devaluations of the U.S. dollar. Since the Trans-Amazon highway was still a long way from the Peruvian border there was no need to rush into the jungle. We decided to work another year.

DURING THAT year, we gathered much information from the 1972 British expedition in Panama. They had spent three months crossing the Darien Gap, the jungle region between Panama and Colombia. The obstacles they encountered were similar to the ones we would face in the Amazon. It became apparent that the Amazon Basin could not be crossed in six months as we had planned. We had to succeed in less than four months or the rainy season could trap us. Also, we had to time the crossing of the most difficult section precisely. If we failed to get across during the driest part of the dry season, the Jeep, the expedition, and possibly we ourselves would sink beneath the jungle ooze.

The British used three vehicles with winches, thirty-three soldiers and scientists, and had horses to push and pull them through the mud and swamps. They were well funded ($260,000), had direct radio contact with the outside, and relied heavily on air and river support. They were a regular army compared to our guerrilla effort. We had only ourselves, a ten-year-old but reliable Jeep, the medicine and supplies we carried with us, and a feeling of great determination. We preferred it that way. Never did we ask for assistance or financial backing of any sort.

After five years of preparation we were ready to go. We knew everything had to be left behind. All our belongings we sold or gave away. We quit our jobs and said our good-byes. There was no turning back if we became discouraged.

At 3 p.m. on August 18, 1975, we turned onto the freeway heading south. The security and tranquillity of Santa Monica was visible in the rear-view mirror. I glanced at Ana, and she, too, seemed to be asking: are we doing the right thing?

We both took a deep breath and concentrated on the road before us. The first kilometer rolled by — 21,999 to go.

(Next issue: Part II). □

Down The Urubamba

by Tom Jackson

THE clouds parted briefly during the flight from Lima to Cuzco. Below, the 6,272 meter high snowcap of Mt. Salcantay rose majestically from the dark green luxuriant jungle forest. Between two ranges, the treacherous Rio Urubamba was busily carving one of the world's deepest canyons.

It's a spectacular river by any measure. From its source on the Quelcayo Glacier, the river winds and swirls over its gravel bed down toward the eight km. gorge of Huambutillo, hurtling past Indians tilling their fields. At Huambutillo and Ollantaitambo it drops some 180 meters in a little over 80 kms. — not impressive in whitewater terms, but unrivaled in the magnificence of the countryside and its unique history. Known as the Sacred Valley of the Inca, it is, at 2,500 meters, flanked by mountain chains with peaks soaring 3,000 meters *above* the valley. At strategic points, the Incas built impressive fortresses centuries ago.

Peaches, apples, avocados, and exotic forms of maize thrive in this climate where Inca nobles built their vacation palaces.

The river flows down through terraced banks with intricate irrigation systems, past small villages on towards the famous ruins of Pisac. Approaching Ollantaitambo, the river narrows, becoming violently turbulent below the town of Chilca. It's here the Incas built a massive fortress as a defense against the fierce Antis Indians of the jungle. Below Chilca and curving around Machu Picchu, the river becomes impassable to all — a raging white torrent. Ahead lie the rapids of Cocabambilla and Sugar Loaf and the boiling waters of the Urubamba as it races into the Pongo de Mainique.

This was the river we'd come to run. Laszlo had been preparing for this trip for more than two years and was the only whitewater expert in the group. This would be the first attempt to run the Urubamba at high water level. My sister Ellen, Peter (Laszlo's brother and Ellen's husband), and I made up the rest of the crew. Assuming all went well, Laszlo planned a regular schedule of commercial trips on Peruvian rivers. We were family along for the ride — willing guinea pigs before he started down river with a presumably less tolerant clientele.

WHAT FOLLOWS are my observations made during the trip arranged to convey the excitement and some useful information to anyone planning a similar trip. I've relied on Laszlo for technical matters, river classifications, and the like.

In a cold drizzly rain, we entered the river near Huambutio (see map), with Laszlo cursing the low water. Kids were everywhere. They seemed to spring out of the ground.

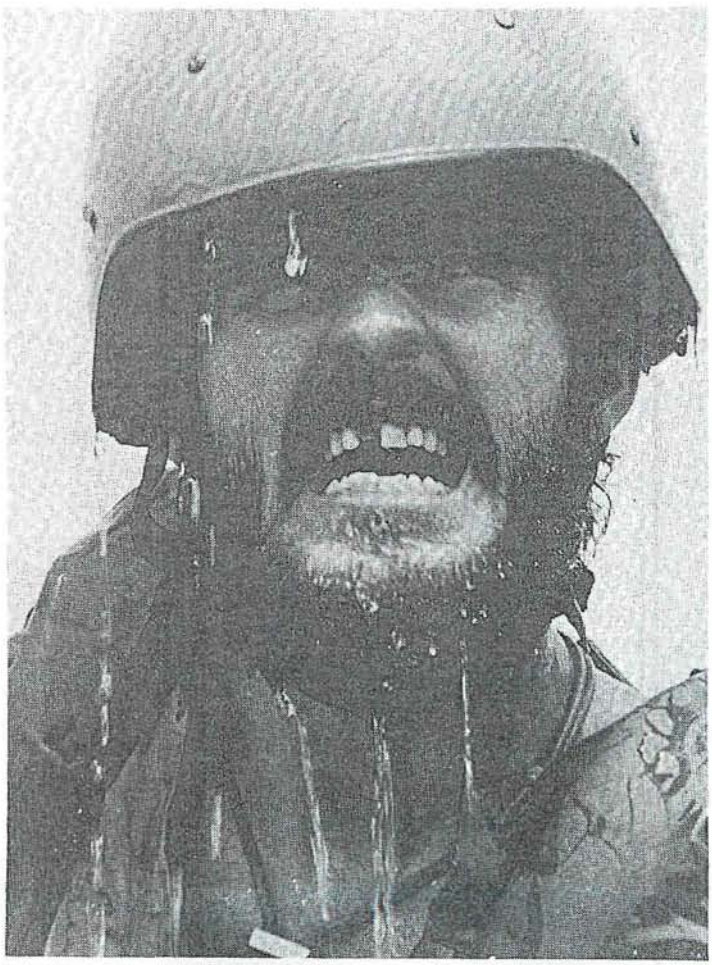
For our descent, we used an Avon Professional Raft modified by David Goodman and Laszlo — a design change which, since it may well have saved our lives, I'll describe in some detail.

Laszlo first removed the rubberized canvas flooring in all three sections and, as shown in the diagram, substituted one inch marine plywood in the front and middle sections. Climbing web, attached with quick-release knots to D-rings on the inner side of the raft, supported the plywood. The back section was left open to facilitate reentry if the raft flipped.

In calm conditions, the plywood floor rides well above the water level, decreasing friction against the water. But the real advantage is in rapids where water splashing over the tubes runs out through holes in the floor and around the web-supported plywood. Instead of swamping, the craft maintains maximum maneuverability at all times.

The wisdom of this design change was not all that apparent, to me at least, until our third day down river. Early that morning we scouted downstream and, from a convenient overhang, got a clear view of class 4 rapids — very turbulent water, rescue difficult, generally not suitable for open craft.

Unseasonably low, the river raced through a 200 meter stretch of boulders. One raft-sized rock stuck up at the far end of this stretch, and if possible, we hoped



to sweep around it. Ellen and Pete climbed the embankment with camera gear. Laszlo and I pushed off.

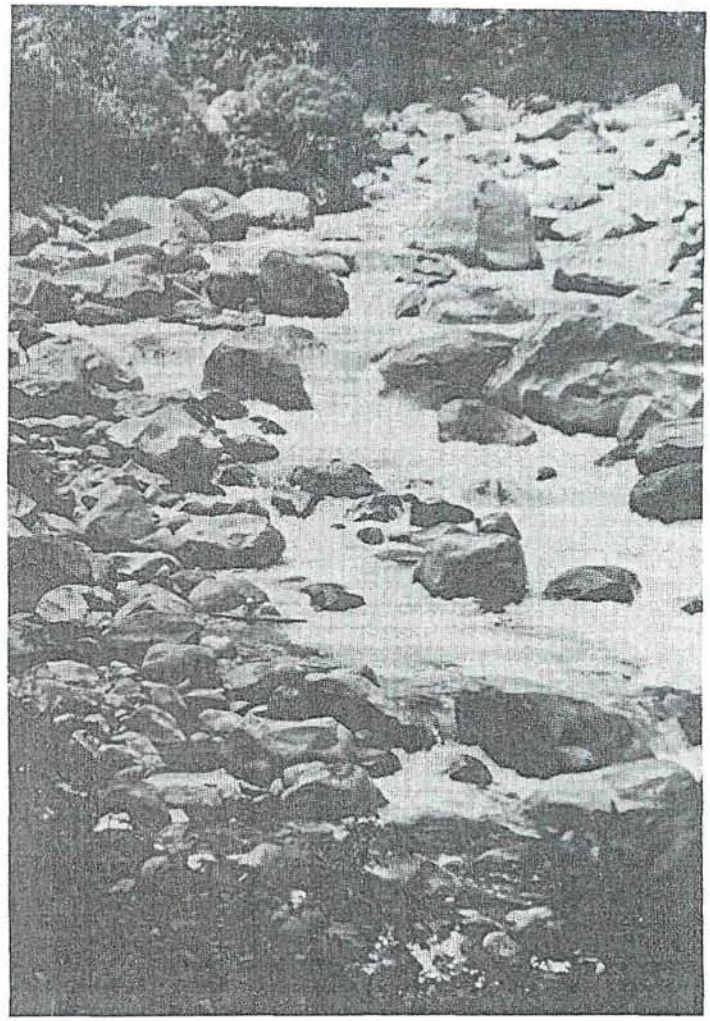
With Ellen and Pete paddling, we might have gotten through. As it was, the raft, laden down with gear for four, responded sluggishly. Even then, we skirted most of the boulders and bounced harmlessly off others until, almost clear, the large rock we spotted from shore loomed up. We piled into it.

Immediately, our stern swung around and slammed against a smaller boulder to the left. Our side exposed to the river, the full force of the current flattened the raft against the rocks.

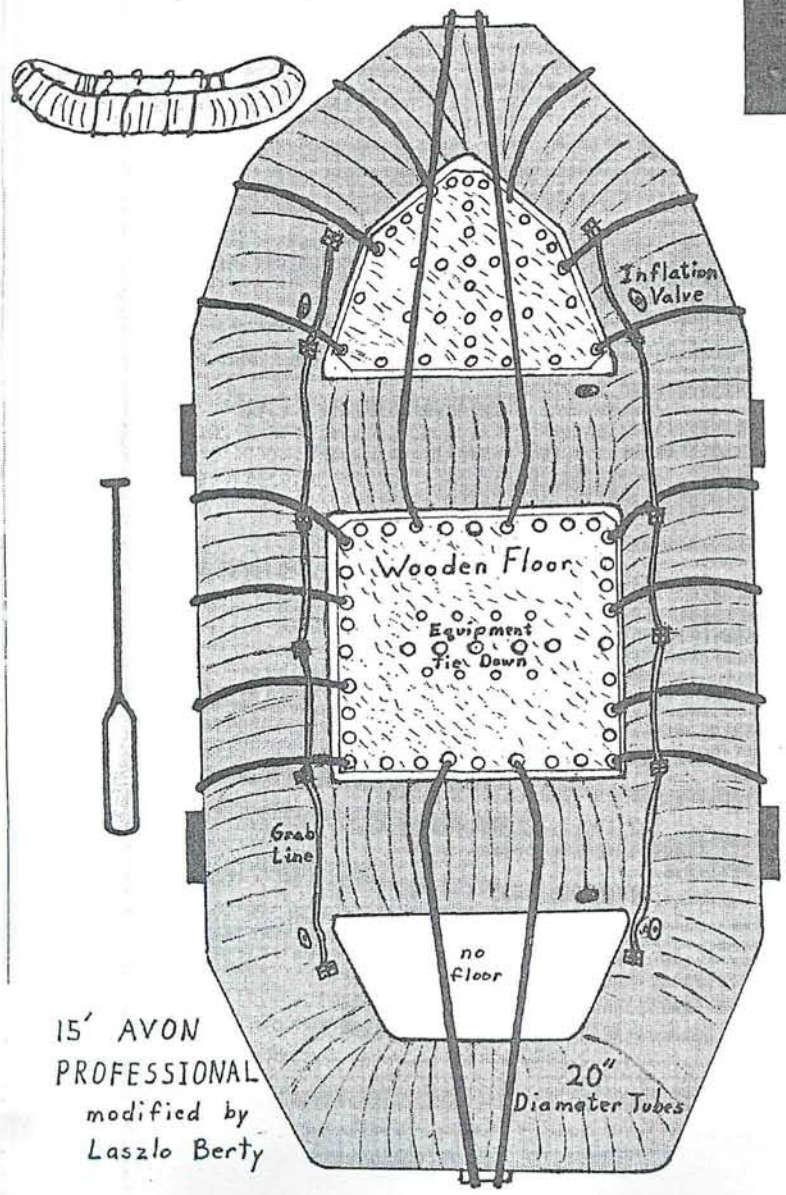
To avoid a flip, we jumped to the downstream side. The raft heeled over on its side. Half submerged in the middle of the river, we hung on for almost half a minute. Then Laszlo, with a powerful kick, dislodged the front end. Instantly our bow swung downstream, and we dived for the paddles. Then . . . nothing. We sat in the middle of the river. Laszlo's kick had popped our open stern over the smaller rock where it looped doughnut-fashion around the rock and held us fast.

Alternately pushing down on the paddles, we wobbled free, gliding around several small boulders to reach an eddy and pick up Pete and Ellen.

Water flowed past the large boulder no less than five meters per second. Up-ended and almost entirely submerged, our raft presented to the current an area of some three square meters. For that half a minute, over fifteen cubic meters of water gushed through the raft every second — enough pressure to shred the original canvas flooring or any other fabric. As it turned out, we got through.



Laszlo (lower left of center) kayaking the Chilca to Chaullay section during the dry season — a suicidal stretch by raft at high water.

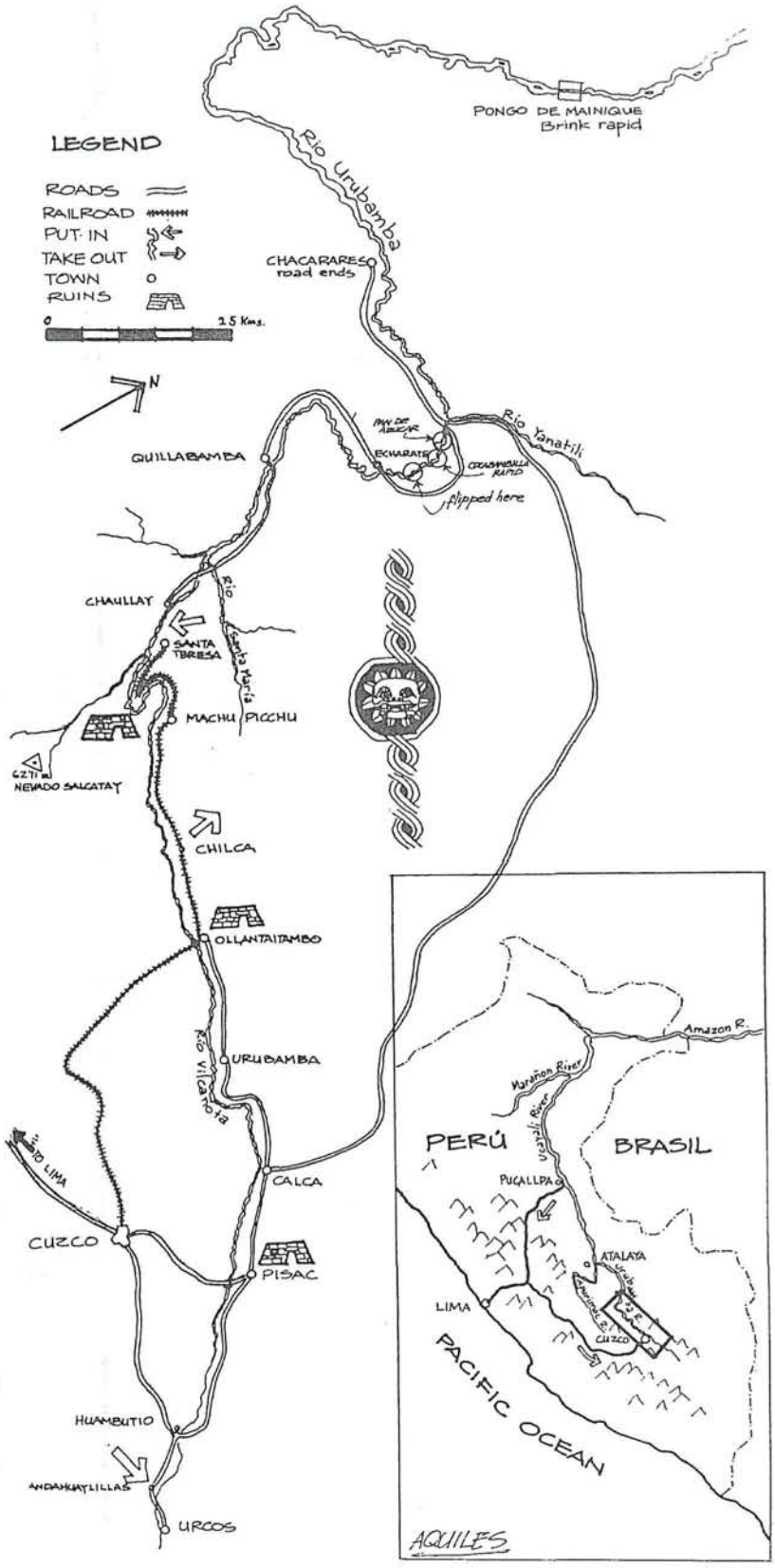


BAROMETRIC pressure is erratic on the upper Vilcanota. Periodic altimeter readings had us gaining altitude for the first three days on the river. We "rose" from 2,880 to 2,926 meters.

Everywhere we passed Indians. Some waved and wished us well. Most stared sullenly as our craft swept by. Also, kids . . . and rocks — a bad combination anywhere. The pattern became predictable. We'd see one kid herding cattle. He'd scream, and in no time a group materialized out of nowhere. Unfortunately, the gravel banks of the upper Vilcanota provide plenty of ammo, and one kid I remember had a good arm. He scored a couple of hits on the raft, and to our dismay, a hit on Ellen. After that, we had a hard time keeping Ellen from loading down the raft with rocks.

Jungle hammocks, which seemed a good idea in the States, we found useless without trees. Later down river, we hardly ever found two trees conveniently spaced. When we did, they were so choked with vegetation it required hours to clear the area.

EACH DAY the action increased. The boulders were bigger than before and the water faster. The volume of the river swelling both from tributaries and daily rains — running some 280 cubic meters per second with 1.5 meter waves, and souse holes big enough to flip a raft that entered sideways.



We pulled out at Chilca, Km. 72 on the Cuzco-Machu Picchu — Chaullay railway line, where the river churns through the treacherous gorge of Torontei. It has killed most who have tried to run it. For 64 kms., the river drops some 22 meters per km. as it tears down the canyon.

We reentered the river just below Chaullay where the Rio Marauy joins the Vilcanota. Over a hundred curious Indians gave us a resounding send-off.

Though it bears the same name, this was not the same river we had left 80 kms. back and 1,500 meters higher up. River volume was up to 850 c.m.s. — uninterrupted rapids for ten kilometers — and holes.

We camped our seventh night on the river, two kms. upstream from Quillabamba. It rained hard all night. The Vilcanota changes its name here. When we pushed off next morning, it was into the Rio Urubamba, now 1,700 c.m.s., and fast.

The churning water clawed at the banks, gouging into and undercutting the cliffs. Seemingly in slow motion, great chunks of earth and rock, and whole trees collapsed into the river. From below rose the grinding rumble of countless boulders which were rolling along in the grip of this powerful river. All around us hissed an infinity of air bubbles, bursting as they popped to the surface.

In low water, on an earlier trip through these rapids just below Echarte, Laszlo and a girlfriend flipped when their raft hit the pillow of a giant boulder. The washing machine action of the seething water had literally washed the pants off the girl.

In high water, it was a different proposition; now that water covered this massive boulder. Immediately downstream, it formed a huge menacing hole. Another hole appeared on the left. The route between the two led into a three meter sliding drop with a breaking wave towering just beyond. We pulled over.

Laszlo explained the all too apparent hazards in whitewater terms. If hit head-on, the breaking wave seemed punchable, and the fifty or so other breaking waves downstream looked "O.K.". The problem was to hit the three meter drop precisely at the center of the narrow V-shaped wake between the holes and exactly parallel to the flow. One problem with this plan was a 1.5 meter breaking wave, just upstream from the wake, that might deflect our approach and send us sideways into the big drop.

Running out of daylight, we camped that night one meter above the rising river, first securing the raft against a possible flood. Early next morning, Ellen and Pete hacked their way through the jungle growth to set up their film equipment overlooking the rapids.

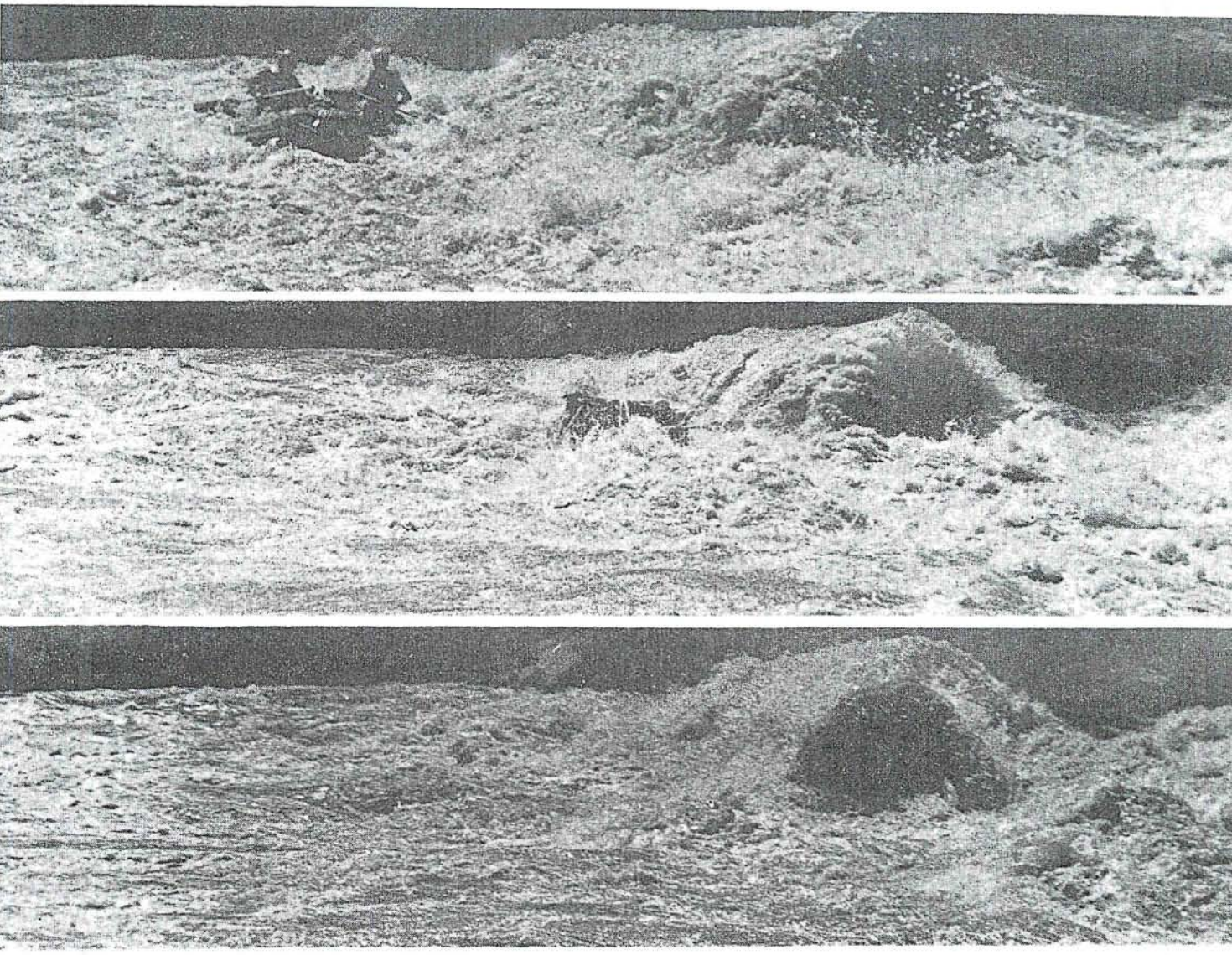
Laszlo and I went over the plan once more, then ferried the raft across the river — just right of center. We turned to face the left shore and let the river take us.

We hit the 1.5 meter wave at an angle, and it came crashing over the side. Holding steady, we got onto the wake. Then everything disappeared. In one smooth, continuous sweep, we dropped into the hole and started climbing up the far side. The bow rose in the air for a second, then pounded on through the big breaking wave and out into the breakers beyond.

Having run the big drop in good form, we relaxed — a bit too soon. A hole caught the raft and down we went. Tons of water crashed on all sides. Lacking forward momentum to push us through, there we sat — surfing backwards upstream until random turbulence flicked us out. Later on, we got to enjoy this experience and steered for the holes.

FOR A WHILE I was considering entitling this piece: "Having the Runs on Whitewater". Still, on calm reflection, I'm now reasonably sure my intestinal afflictions had little to do with what we ate. On rapids, you end up involuntarily swallowing a lot of river water, and in eighteen days, I took in enough to account for any number of fatal diseases.

But to food. We brought a few bacon bars and



GOING... GOING... GONE! *That's what we were thinking as we disappeared into this hole near Quillabamba.*

freeze-dried dinners along with the equipment, but stowed these away as emergency rations. The idea was to buy our food en route, and this plan worked out pretty well, though the variety was decidedly limited. In the mornings, we subsisted on oatmeal pepped up with powdered milk, chocolate, and sugar. It's almost always possible to find canned tuna or sardines, rice, cornbeef (less often), spaghetti, tomato sauce, and dried soup in villages and towns along the river. We snatched up condensed milk, bread, and jam when we could, and any local fruit. To anyone thinking of going down a Peruvian river — two warnings. First, beware of the canned frankfurters which taste like dogs gone bad. But even these rate as a choice delicacy compared to *queso de chancho* which translates literally as "cheese of pig". This congealed mass exudes a singular stench even before the can is fully open and consists, as far as we could make out, of rancid pig fat with an abundance of stiff black hairs from the same animal.

Ignoring canned pig in any form, the rest of the fare was adequate, and we supplemented it with occasional restaurant meals. Between the four us, I figured out we spent US$121 for the seventy man days which works out to about US$0.66 per meal.

BEFORE taking on the Miraflores Rapids, we set out along the shore. A helicopter would come in handy for scouting jungle rivers. Lacking this convenience, we put in half an hour of sweaty work slashing at the matted vegetation — an effort that got us no more than ten meters downstream. Since the rapids might have gone on for hundreds of meters, we backtracked.

As the river curved right before turning into the rapids, the four of us piled aboard the raft with the idea of getting a better view downstream from the far shore.

So much for the plan. The river proved more powerful than our efforts at the paddles. Suddenly, we found ourselves hurled into the unscouted rapids with two meter waves everywhere. To reach either bank, we'd have to point the bow one way or the other, and so run the risk of being flipped by a breaking wave. Hitting each wave head-on while working our way toward the side, a "six-footer" spun us sideways and into the trough of a monstrous three meter breaking wave. The steep face curled over us, and . . . we flipped.

I came out from under the raft on the downstream side, still clutching my paddle. Moving to one side, I saw Ellen holding onto the raft, also with paddle. (I mention the paddles because of Laszlo's repeated insistence that any equipment lost had to be replaced at astronomical local prices). Pete, it seems, had jumped into the hole as the raft turned over. He was left upstream behind us.

Laszlo was the first to get aboard, using the floor-

NARROWING dramatically, the Urubamba enters the Pongo — 5 kms. of whitewater.

less rear section and jackknifing himself up. He pulled Ellen in, then me, and we finally picked up Pete who had lost his paddle in the hole.

Righting the raft, we took stock. One paddle gone and the food bag with cooking equipment and an emergency kit. Not bad. Later, Ellen spotted the paddle. The food bag may well have reached the Atlantic Ocean.

Taking our flipping as a warning, we pulled over. Laszlo and I scouted downstream. Ahead the Urubamba showed signs of going berserk. Additional tributaries and continuing rains had swollen the river to some 2,000 c.m.s. The muddy water churned white with steep drops, violent holes, and explosive waves. Water crashed against unclimbable walls. Later, from above, we looked down on these rapids, the Cocabambilla (see map), and further down river, the Pan de Azucar or Sugarloaf Rapids. On an embankment 400 meters above, they still looked hellish, which gives some idea of the uncontrolled turbulence below.

After scouting the rapids once more at a lower level and weighing the dismal probabilities, we faced up to the necessity of a grueling portage. No fifteen foot raft could get through these rapids at high water, maybe a thirty foot pontoon raft with an expert crew, but even that looked doubtful.

AHEAD lay the Pongo de Mainique, the last major rapids on the Urubamba which promised to be the best of all. Unfortunately, Ellen and Pete now suffered from the same stomach problems that hit us all at different times. That night they decided they weren't up to the rest of the journey. The next day we relaxed together in the small town of Miraflores, upstream from the menacing rapids, and talked over the adventures we'd been through and what we'd learned.

If we could take the trip over (and I'm ready any time), we'd change a few things and do other things differently. For what it's worth, I'll pass on our insights while they're still fresh in my mind.

Watch out from whom you take advice on river conditions or anything else for that matter. Most people who live near rapids have never been on them. Once, we asked the distance to the Huarran Rapids and were confidently told eight kilometers. When questioned closely, our informant blithely revised his estimate to thirty-two kilometers. We rarely met anyone who "didn't know".

Two problems we hadn't anticipated were "diaper rash" and athlete's foot. By the time you feel even slight discomfort from "diaper rash", it's already too late. Where possible, take your pants off immediately.

Athlete's foot almost ended the trip, and it's doubtful we could have gone on when we finally did stop. As it was, the bottom of Laszlo's feet looked like raw meat, the skin almost entirely gone. I had a less severe case which I credit to Vietnam jungle boots. They let the water drain out, they're comfortable when wet, and provide good traction and support.

An important consideration in buying a tent is to match it to the raft. By pure luck, our tent fit exactly, and on the last long stretch to Pucallpa when we had to sleep on the raft, this paid off.

SINCE Ellen and Pete were heading back to Lima and then home, Laszlo and I stripped away everything that wasn't absolutely necessary. We were travelling light for the Pongo.

Chacarares, a small town five kilometers upstream, is the last chance to get off the river before the Pongo de Mainique. Below Chacarares, the Urubamba narrows dramatically from 100 meters to less than 30 meters, gathers momentum and hurtles into the Pongo through vertical 100 meter cliffs — five kilometers of continous whitewater with three major drops.

Just upstream from the Pongo (a Quechua Indian word meaning "gateway"), the whirlpools start. One, two meters in diameter, foamed beneath our raft. We weren't steering for them then — later yes, but not now. Spinning out of control, we saw our entire stern disappear into the swirl, our bow lifting 30° out of the water.

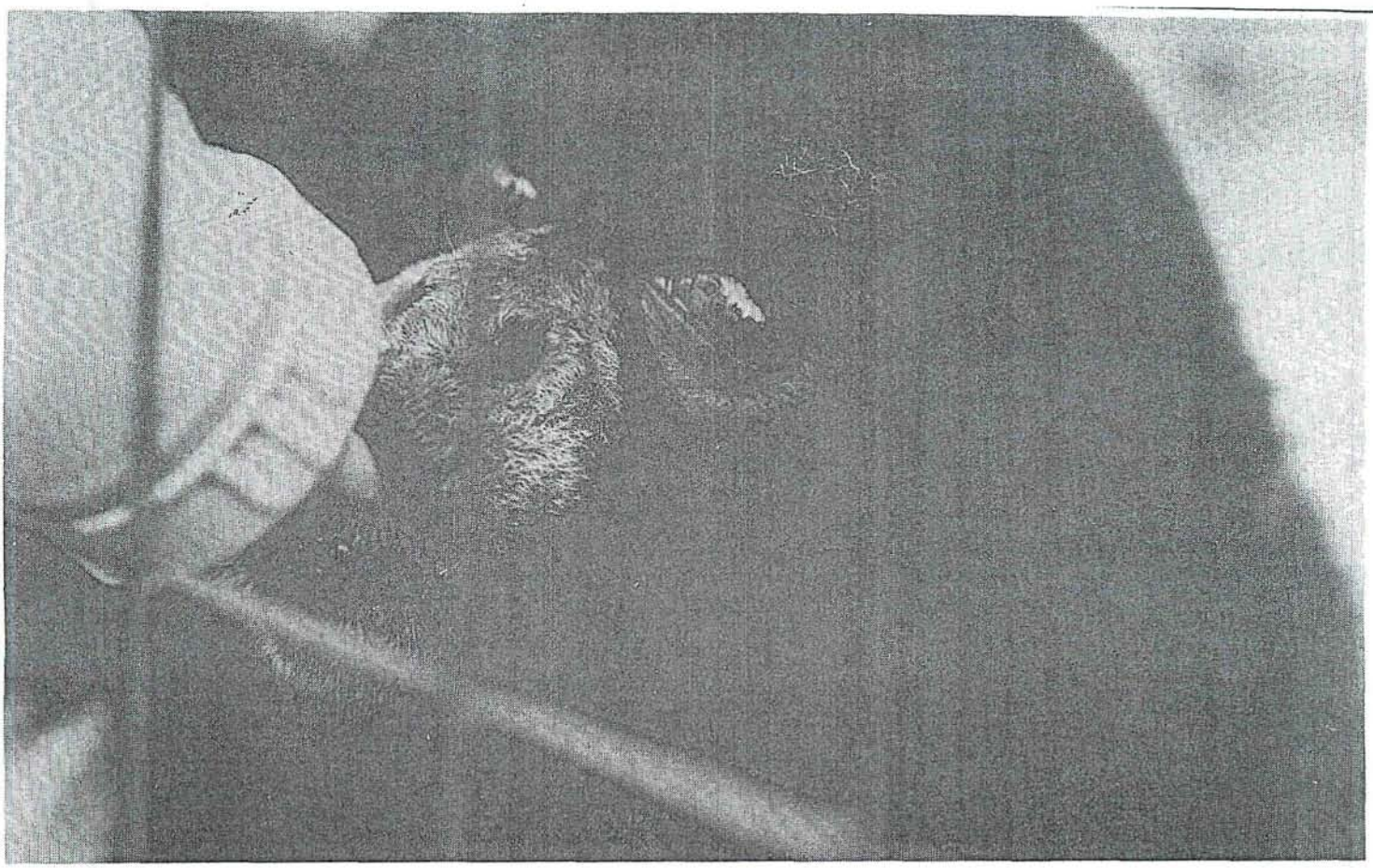
Swept into the Pongo, all is confusion, our raft thrown from side to side, sometimes skimming downstream, now upstream, every which way, tossed like a cork in a tea kettle. Dashing against the convoluted walls of the canyon, the torrent rages into great whirlpools far vaster than any we've seen before. Near-vertical walls block out the sun, and from over the top of the enclosing moss-covered cliffs, a multitude of waterfalls plummet down on either side. The roar and confusion is incredibly magnified, growing greater all the time until thrust around the last bend — the largest cascade of all — a fifty meter arc of water pounding down into the surging current directly ahead. Below the fall, an enormous whirlpool swirls, formed by the cascade as it strikes the flow — seven meters in diameter and two meters deep!

We steer for the side, straining on the paddles, getting nowhere. Times slows, and yet we are actually accelerating, closing with the whirlpool. The raft teeters on the rim, and we begin to rotate back *upstream* — our circular course sweeping us around and under the falls.

Helpless now to escape from the Brink (as we later named the whirlpool), I clutch my paddle and burrow between the equipment, against the side tube. I suck in a last lungful of air as our bow edges towards the falling torrent.

The raft shudders, jolted by tons of falling water thundering down upon us. Battered under the fire-hose impact, I feel my body grow heavy, leaden, and as if in a dream, I seem to be swimming, endlessly.

Then suddenly, it was all over. We were gliding over open water without a scratch, away from the Brink. The incredible Pongo — it was worth all the tuna fish, the oatmeal, all the wet misery, everything. □



Search for the Extinct Monkey

by Loretta McLaughlan

A monkey presumed extinct, is not only a celebrity, but if current plans work out, he may soon be a daddy as well.

Lagothrix flavicauda, or "Flauvy" as he is known to his keepers, is the world's only yellow-tailed woolly monkey in captivity. At the moment he is passing his time with a playful common woolly in Lima, Peru, where an expedition is being outfitted to find him a mate.

Until a few years ago the only authoritative report on **Lagothrix flavicauda** was published in 1812 by Alexander von Humboldt, the famous German naturalist and explorer. Humboldt never saw a live yellow-tail, but he was the first to identify it as a separate species after studying several pelts used as saddle covers by mule drivers near Jaen in the district of Cajamarca, Peru. Still, Humboldt knew so little about the monkey that he considered it a new species of howler monkey — not a woolly.

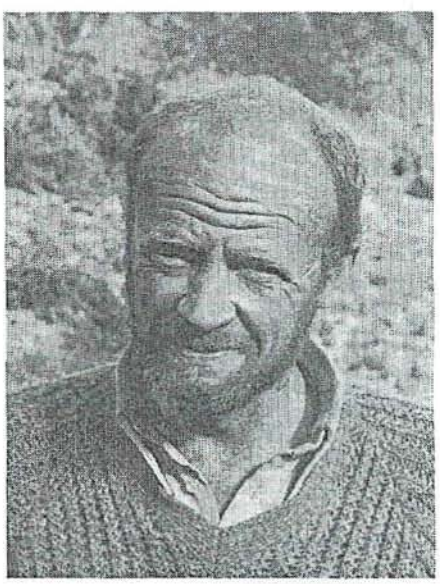
Since only a few pelts came to light during the next one hundred years, many scientists, understandably, thought the monkey extinct. In all, only five skins (the last collected 1926) were known to exist before 1974 — two at the Museum of Natural History in New York and three at the British Museum of Natural History in London.

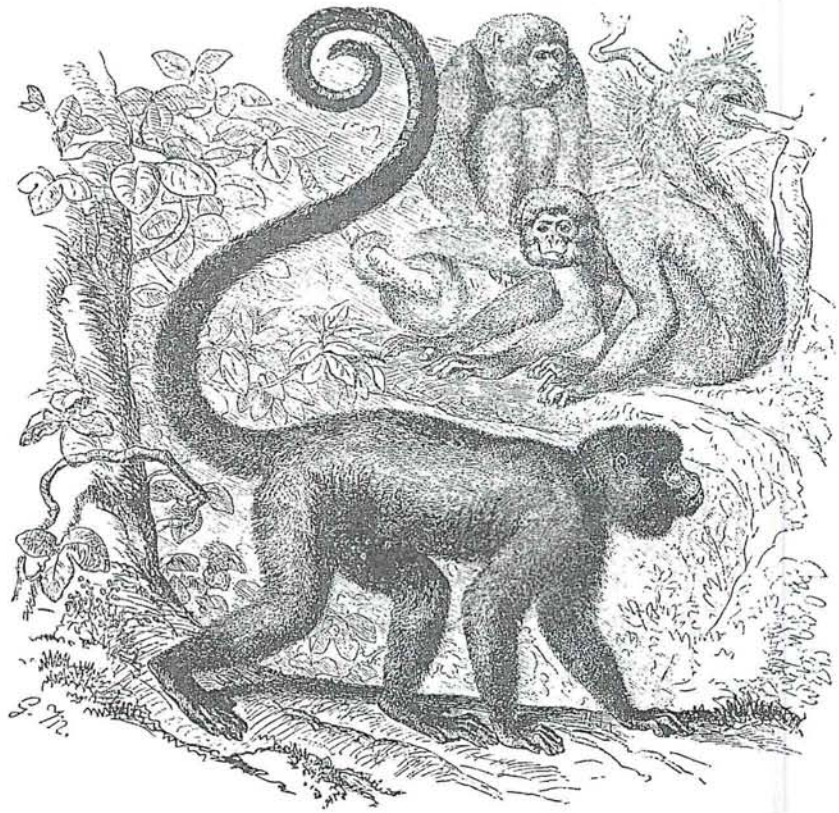
So rare is the yellow-tail, that it was not until 1963 that the five existing skins were positively identified and linked to Humboldt's discovery. Even then, until Flauvy was discovered, some primatologists wondered if these skins might not just represent a color phase of the common woolly.

For more than a hundred years following Humboldt's discovery, very little was heard of the animal besides the two skins Watkins collected in 1925 and three more discovered by R.W. Hendee in 1926. Looking for a yellow-tail, an expedition led by Dr. Oliver Pearson of the Museum of Vertebrate Zoology, Berkeley, California, searched the jungles of northern Peru in 1940 without success.

WHEN A three-man research team set out to comb an area of the lower Andes on April 26, 1974, no scientist had ever seen a living yellow-tail. The three were Dr. Hernando de Macedo-Ruiz, curator of birds and mammals at Lima's Natural History Museum, Russell Mittermeier, a primatologist from Harvard University, and Tony Luscombe, a naturalist, recently named consultant to the Pri-

TONY LUSCOMBE — *Consultant to the Primate Specialist Group.*





HUMBOLDT'S WOOLLY MONKEY

(1/6 nat. size). They take their name from the thick coat of woolly fur which is found beneath the longer hairs.

mate Specialist Group of the International Union for the Conservation of Nature and Natural Resources.

The trio set off from Lima by bus for Chiclayo, 764 kms. north. Their expedition, self-financed, was to last twelve days — the time remaining of their yearly two-week vacations.

Leaving Chiclayo, early the next morning, the group hitched a ride on a passing truck bound for Chachapoyas (see map), the area where the last skins had been found by the 1926 Hendee expedition.

Until 1960, no roads entered this region. In that year, the Peruvian army, with funds from the United States A.I.D. program, began construction of the highway known as the **Marginal de la Selva.** Its purpose was to open up isolated jungle areas to colonization and economic development.

The Marginal Highway slices through the known habitat of the yellow-tail. Professional hunters, employed by the road crews, regularly shot monkeys, bears, and other large animals for food and skins. Restricted to an area threatened by destruction, and prized as food because of its large size, chances of finding a live yellow-tail monkey looked bleak.

THEIR TRUCK pulled over several times to pick up travellers. At one stop, several hunters climbed in, and while helping them aboard, Dr. Macedo spotted animal skins in one of their plastic bags. Introductions followed, and after some discussion, one of the hunters pulled out his largest skin — unmistakably the pelt of a yellow-tail. Dr. Macedo says, "We were elated. After carefully plying the hunter with questions, we arranged to meet him the following week so he could take us to his hunting ground".

The crew was in good spirits when they arrived in Chachapoyas, having proven, only 24 hours into their trip, that their search had some chance of success. There was even talk of finding a live specimen. But exploration is a curious thing. The goal may seem to be within easy reach only to be more distant than ever.

Finding nothing in Chachapoyas, they travelled on to the small town of Rodriguez de Mendoza. That evening, a local guide assured them he knew where to find a yellow-tail.

Their guide showed up the next morning clutching a whiskey bottle no longer full. By midday, he had led them many miles along mountain paths, stopping frequently along the way to fortify himself. He was most successful at finding the bottom of the bottle.

Late in the afternoon, they decided to turn back. Their guide snored noisily by a mountain stream. Time was running out. Since there was still a chance of meeting up with the hunter whose skin they had purchased, they left their guide to sleep it off and headed back.

"The hunter was there right on schedule," said Dr. Macedo. Once again hopes rose. "We climbed several hours along the steep mountains to the hunter's 'place' — an idyllic little collection of thatched huts near a waterfall. The following day we set out up a verticle hill into the mountain rain forest where the first specimen had been shot. We spent the whole day searching, but without success. That night, we slept in a cave with a well-stocked fire beside us to scare away predators and the vampire bats which probably lived there". The following day was a repeat of the previous one — no luck. "We returned somewhat disappointed; this had been our last chance to see a live yellow-tail."

They did find two more skulls and three more skins in the hunter's house, thus, nearly doubling the number of specimens in the world's museums. But this was poor compensation for the disappointment of not seeing the animal in the field. The expedition was over. It was time to go to Lima.

With only a few hours left, they began asking the locals of Pedro Ruiz about monkeys. A crowd of children gathered and they were led to a house containing stuffed monkeys. Taxidermy is a rather popular hobby in Peru, but these were badly mounted, all common, and no yellow-tails. Walking back to the center of town, another young fellow stopped them, stating that he knew where a live monkey was kept. They didn't believe him, but he persisted. The house was close, he said, so . . . they went.

"As soon as we saw it, we knew that luck was really with us", Dr. Macedo related with a smile. "There, sitting attentively on a chair, was a healthy, Peruvian yellow-tailed woolly monkey — the first living example of its kind ever seen by any scientist".

As the monkey scampered from one family member to another, shyly eyeing the strangers, it became apparent that the "extinct" yellow-tail was a happy member of that Peruvian family. Not only that, but he was a lover's gift to his girlfriend, the eldest daughter of the household. She would do nothing until she talked to him.

Another day passed before this fellow, a soldier, could be found. As expected, he was unwilling to part with the animal. Dr. Macedo, however, explained the importance of the yellow-tail to Peruvian zoology, and the soldier's sense of patriotism prevailed.

The New York Zoological Society is funding the next attempt to find a yellow-tail — hopefully a female of suitable age to provide Flauvy with a mate. Tony Luscombe, one of the members of the original team that discovered Flauvy, has worked out a general strategy for the next expedition. Since he does not expect to be lucky enough to buy a second **Lagothrix flauvicauda,** and as, this time, he will have more than twelve days in the field, his preparations are somewhat more elaborate. Using blowguns, or alternatively a CO_2 rifle, with tranquillizing darts, and equipped with an array of ingenious traps, the expedition hopes to capture several specimens or enough to start a breeding colony. The expedition is purposefully ambitious, as this may be the last chance to save the yellow-tail from extinction.

It is by no means certain that any yellow-tail remains in the wild, nor is the problem solved by simply finding a mate for Flauvy. Breeding animals in captivity is tricky. Further, it may be that Flauvy has already sexually imprinted on one or more of his keepers. In such a case, he will not mate with a female yellow-tail, no matter how alluring her simian cnarms, since he will only regard humans as desirable.

DR. HERNANDO DE MACEDO—RUIZ - *Curator of Birds and Mammals at Lima's Natural History Museum.*

There are ways around this problem such as artificial insemination, but many obstacles as well.

To save the yellow-tail, much has alrea dy been done. Dr. Macedo's team has recommended that the species be given full protection within Peru. Also, at their request, the monkey is now listed as an endangered species in the **Red Data Book** of the International Union for Conservation of Nature. Finally, there is now considerable interest in creating a national park or sanctuary to include the monkey's known habitat. Such a protected area would save many other rare and endangered species, like the spectacled bear **(Tremarctos ornatus)**; the mountain tapir **(Tapirus pinchaque)**; the cock-of-the-rock **(Rupicola peruviana)**; and the marvellous spatula-tailed hummingbird **(Loddigesia mirabilis).**

Reports on the upcoming expedition will appear in later issues of the South American Explorer. □

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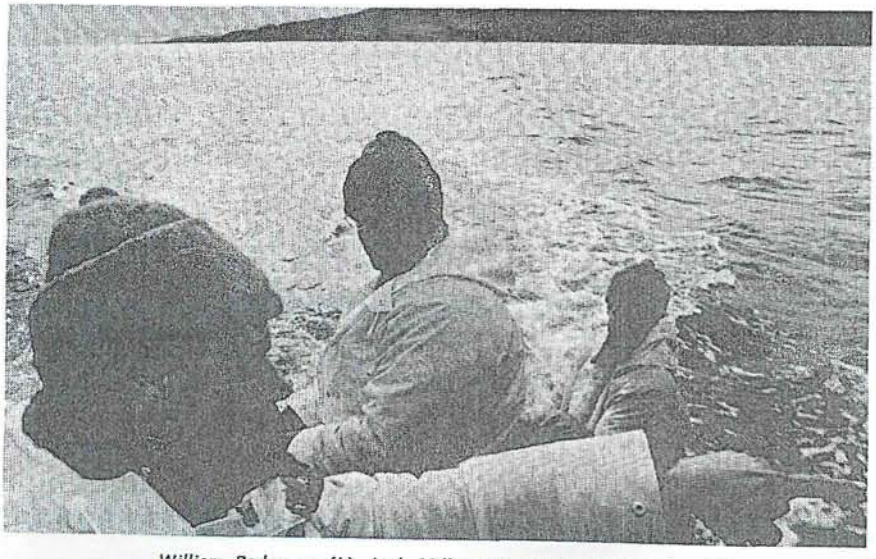
Sea-Going Mountaineers

By Jack Miller and William Rodarmor

PHOTOGRAPHS BY THE AUTHORS



William Rodarmor (L), Jack Miller (C), Peter Bruchhausen (R).

Travelling in a open inflatable boat forty-five days through the ice-strewn Patagonian fjords of southern Chile, Jack Miller, William Rodarmor, and Peter Bruchhausen covered several hundred kilometers to make the first recorded crossing of several land isthmuses, survey unmapped regions, and scale the summit of the previously unclimbed Gran Campo Nevado, one of the prizes of Patagonian mountaineering. The following is an account by Jack Miller and William Rodarmor of their ascent of the Gran Campo. A later article in the South American Explorer will describe the journey of the three sea-going mountaineers through Otway Sound, Condor Fjord, the Iceberg Narrows, and the Gulf of Xaultegua.

NOW I lay awake as my two compañeros sleep off their exhausting day. I am charged with the excitement of being fully alive. This taking problems one at a time, dealing with them, then moving on to the next is the essence of expeditioning, and I look forward to the last and biggest challenge, the Gran Campo Nevado.

The Gran Campo is a huge snow field, an outrider of the great Patagonian ice cap that runs down the backbone of the Andes. Vast and smooth, it lies draped over the center of the range like frosting on a birthday cake. It has been a goal Peter and I have had ever since we spotted it on a map eight years before. Now, it is almost at hand.

This evening, the water lapping at the Shipwreck Camp beach is calm, though the winds aloft are strong: the sky is empty; we see the sunset colors for the first time in over half a month.

After dinner, we sort rations for the climb, make prussik slings, measure ropelengths, count pitons: Peter adjusts gaitors to his boots; William breaks out his climbing clothes. Our small, specific tasks are part of the last-minute fidgeting which climbers everywhere use to cover up their excitement — and their doubts. None of us are in top shape.

My hands are badly chapped, and simple gestures cause pain. I hope they don't hamper me. Peter twisted his knee before the trip, and it's been bothering him, but I imagine he'll be OK. He's been wanting to get to the Gran Campo for a long time. This is William's first trip in Fuegia, and his energy has been sporadic. The important thing is that we are here, and we're going up!

07 NOVEMBER — Shipwreck Camp to High Camp. Jack writes:

In the early morning, we debate what to do with the camp. Any passerby would spot it out on this point and could well help himself. It seems foolish to worry about passing thieves so far from civilization, BUT it is that very distance that makes us uneasy: we depend on our boat for our very lives. In the end, we leave our camp pitched to look as if we are in the vicinity, but hide the motor and valuables in the thick brush nearby. We pack our loads and start.

We make good time, climbing steadily. Grassy hummocks give way to snow. Avalanches repeatedly rumble off the nearby cliffs. By two in the afternoon, we reach a small open shelf 1200 meters above the water which will serve as an advance camp, putting us within striking distance of the great icefield and the summit. William and I drop our packs and decide to explore the route further. Peter's leg is bothering him, so he stays behind to set up camp. As we leave, he calls out: "Now don't go climbing the Gran Campo without me!".

William is very strong, punching steps in the deep mushy corn snow that cascades down in little surface sluffs. Seeing a new snowfall two days earlier, I worried about avalances: I am still worried. We pass over a snowy dome that forms the shoulder of the mountain, and get breathtaking views of "Ice Bay", its towering backdrop of peaks. Above the dome, we cross the glaciar's bergshrund with some difficulty and come to the giant step.

We spotted this cliff from below, but could never estimate its size. It is part of the great ice wall that runs the full length of the Gran Campo, without a break. Above it, going should be easy. We were below.

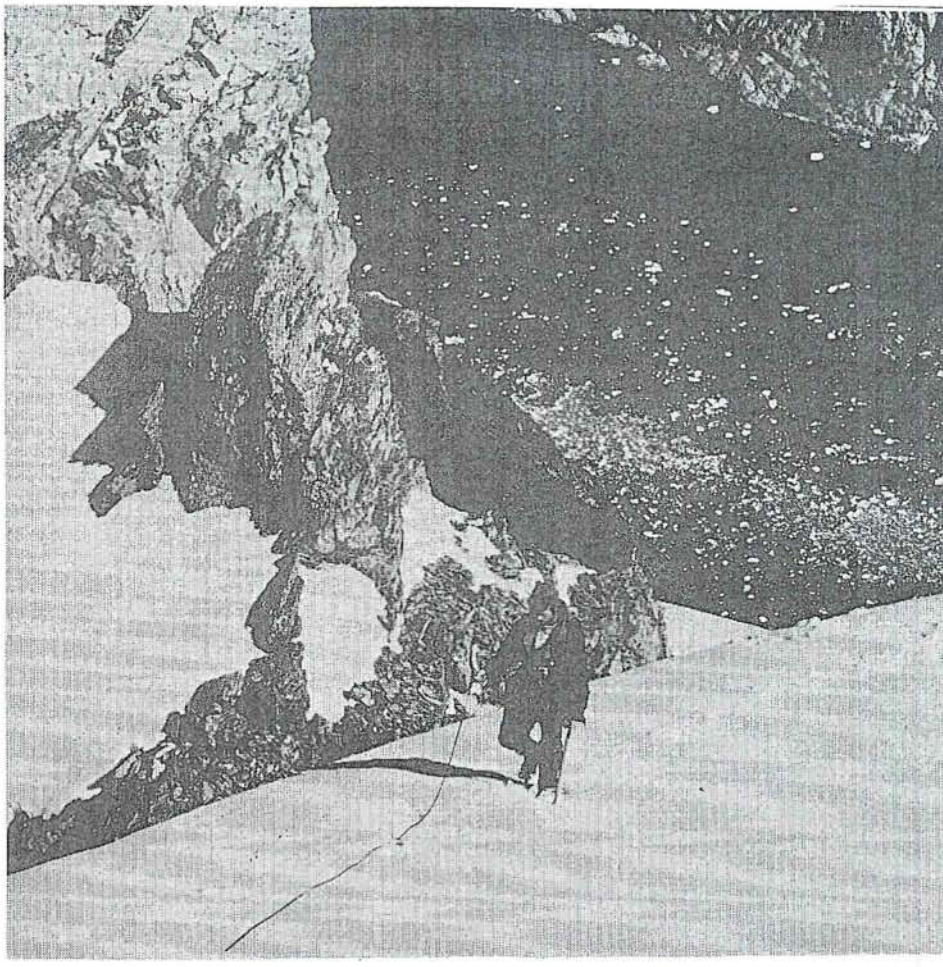
William digs into a solid belay, and I try going up a crevasse system to his right. No good; a blind alley. I back down and work left instead, muttering. I'd never encountered anything like this before. The snow wall is vertical, but so soft and slushy you could burrow in like a rabbit and still not get a purchase.

I am carrying our entire equipment rack: three long aluminum tubes; a pair of "dead men" (aluminum plates used as snow anchors); and a pair of ice screws. Finally, as I move up, I manage to put a screw into firm ice. This way, I'll just dangle here when the whole mess avalanches out and the heavy slop plows straight down the chute to the fjord. My mood could be better.

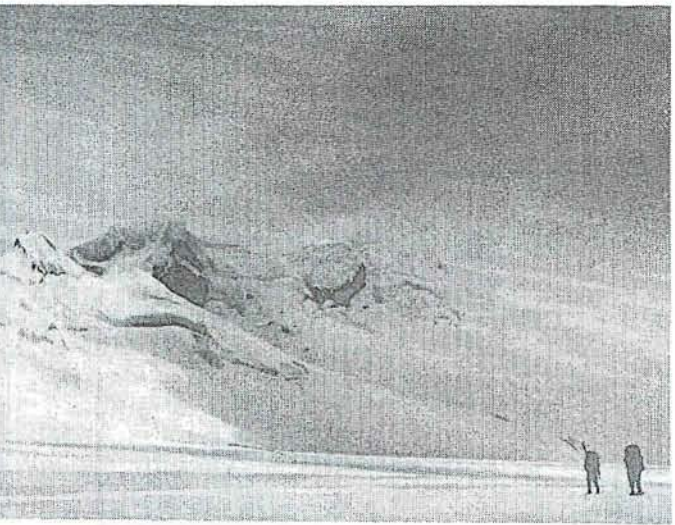
Climbing crabwise, I get far enough around a corner to see what might be a chink in the cliff's armour — a sort of snow-filled crevasse that splits the edge of the ice wall. May as well try it.

The damned snow is so bad! Heavy and unstable. It holds together just enough for me to cut large steps into the steep wall: I hope they won't wash out from under us. It is scary at first until I realize the snow is actually holding my weight. When I grasp that, it becomes just another excavation project: scrape off the loose surface stuff; carve a step, maybe half a meter deep; gingerly shift my weight into it; and start again. Great fun.

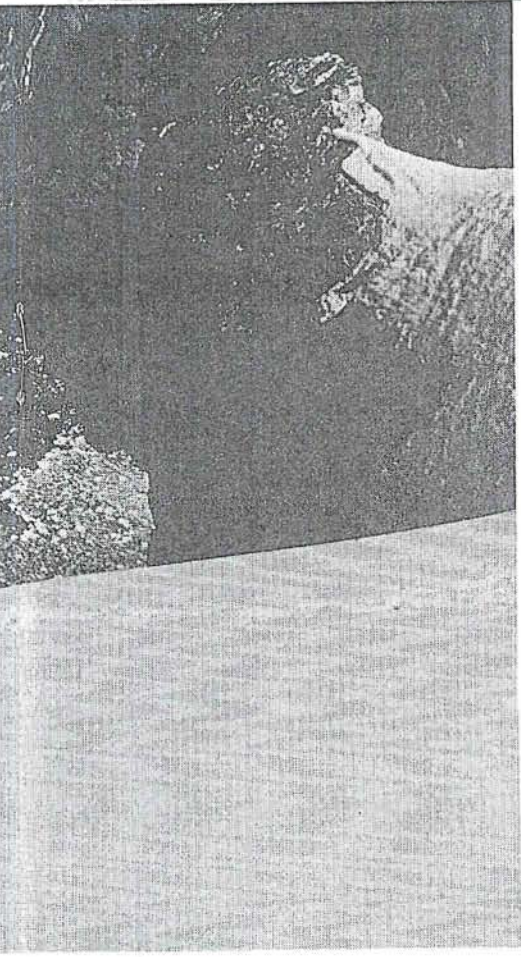
After a good hour of this, my legs are soaked, but I make it to the top of the cliff. William comes up, somewhat amazed at the whole procedure, and we decide to have a look at the Campo. A half hour's walk gains us another seventy meters, and the general layout of the ice cap



ASCENDING the Gran Campo Nevado. In the background, the inky-black wate



VIEW of the summits capped by the "mushroom ice" — strange layering of quasi-ice, hard and soft at the same time.



of a Patagonian fjord.

starts to unfold. It lies before us, a smooth white plain, oddly punctuated by various hillocks, which give no clues to distance or height. There is so little for the eye to hang onto that scale seems meaningless. We each decide what we think is the highest point, and each feels the other is wrong.

Here we are on the Gran Campo, the spring sun still fairly high in the northwest, a few hours above the horizon. Should we climb it right away? The beautiful weather will certainly not last — the snow is so good on top, we hardly sink in. A two-man team would move fast...

As evening falls, we rappell down the giant step on the fixed line. A beautiful yellow glow keeps William on the ridge taking pictures. I descend to camp, knowing Peter must be wondering what has taken us so long. He wanted so much to be with us, that his welcoming cup of hot tea seems a fair swap for the news that we did not climb the peak.

Night falls, and an odd, mystical mood slips over me. Maybe the gods can be persuaded to give us some help. It worked once before: after being pinned down for nearly a week, Peter secretly vowed to sacrifice all his expedition candy rations for a spell of good sailing weather. It worked then — why not now? I step out of the tent into the darkness, and make my own deal. I will give up my favorite food — chocolate — for the rest of the trip if tomorrow is clear enough for us to climb to the top of the Gran Campo. I feel we have done our share; 1700 meters of climbing, two-thirds of it with heavy packs. Our reconnaissance licked the technical obstacles. The rest is up to fate. We turn in, tired and happy. Tomorrow will just be a matter of putting in our time — if the weather holds.

08 NOVEMBER — Upward. Jack writes:

Dawn is cloudy; solidly overcast, but high and well above the peak tops. The sun gleams through, a sickly yellow under a black cloud layer, then disappears. We get ready in a hurry: it looks as if we won't have much time. Besides, our schedule and rations are tight. We can't afford to sit around. Despite our haste, it takes us three hours to get over the cliff. The steps deteriorate rapidly as we climb. By 10:30, we crawl again over the lip of the Campo. Once more we are faced with the problem of selecting the highest point, but everything looks the same — rolling hills rise from an immense, featureless plain of snow. Under the overcast sky, the terrain shows no relief whatever.

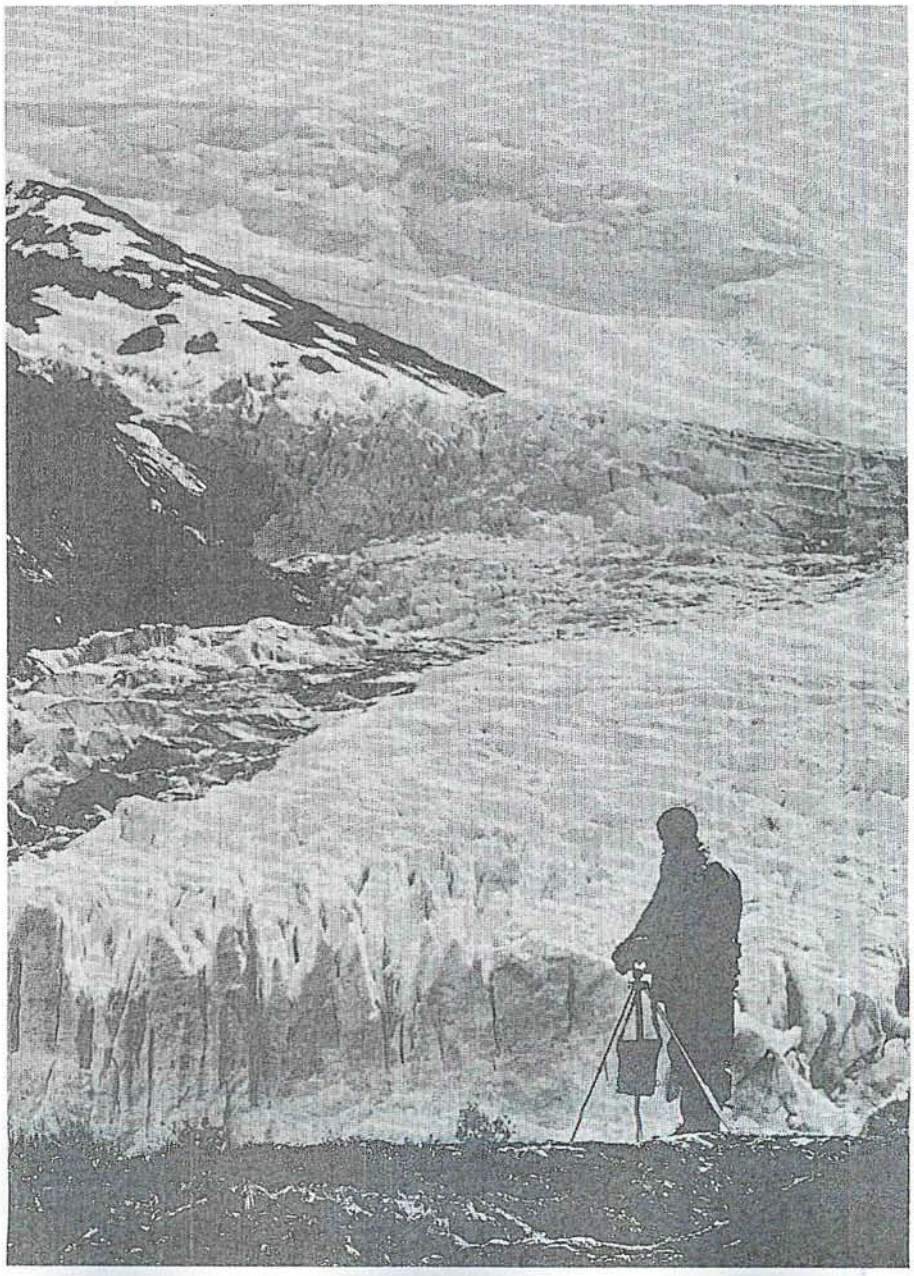
We set a course for a distant hillock and walk. And walk. And walk. Our route has no dangers, but no distractions. It leads straight as an arrow toward our chosen peak. Luckily, the snow is fairly compact, so we don't sink in to far. We just trudge ahead. The work is hard, the tedium deadening.

WILLIAM WRITES: I am glad Jack is leading. All those hills look the same.It'll be his fault if we've chosen the wrong one. Also, he gets to break trail, but his steps seem too short for me. My thighs and pelvis soon start aching. I am a 19th century Chinese lady, hobbling pigeontoed on bound feet. The ache spreads to my back and calves. We trudge on.

In three hours, we stop exactly once. Just as well: it would be harder to get going again if we rested more often. Jack is just trucking along. I marvel at his determination. I find myself overtaking Peter — I am moving too fast. I pause and let him take up the long loop of slack in the rope joining us together. I stare dully as the rope hisses out, and am startled when it goes taut and tugs me on.

To keep myself going, I summon up odd memories, like snatches from old songs. Most of the time I admire the patterns my bored retina creates on the flat landscape: the view has all the charm of the inside of a ping pong ball.

"Now don't go climbing the Gran Campo without me"



Later, I learned what my partners were thinking. Cursing his bad knee, Peter swung between angry lows and jubilant highs as the goal of his eight-year dream drew closer. Jack fleshed out the emptiness by recalling, in his mind's eye, every inch of a cross-country ski race from another place, another season. He strained to bring back each detail, recreating the remarks and the faces of friends in the race, the rhythm of his breathing, the pounding of his heart. He was recalling every detail, not rushing ahead, making it last. While I trudged and Peter swore, Jack was ski racing.

Was the hillock any closer? It didn't look it. An observer would think us mad to walk so far to reach a point only a few hundred feet high. But standing on the true summit is part of the job. As we slog, we get a real appreciation for the extent of this great ice cap. We have to measure things personally, stubbornly. My legs are teaching me distance in a way a pair of map dividers never could.

The slope grows steeper. I keep looking around anxiously, still afraid we picked the wrong summit. As we rise higher, though, the other contenders drop one by one below us. Jack's choice has been good. Finally, I have only to pick between three cauliflower-like domes of ice. I turn to my companions. They just shrug, so I head for the one in the middle — it's only another 50 feet.

The top! The real top! There is another nubbin a few kilometers away, but it is no higher than ours. The top of the Gran Campo Nevado. Over his protests, we made Peter go first. He had dreamt of this place for so long, and his energy helped get us here. I am so excited, I run around like a squirrel, taking endless summit photos, losing my glove, chasing the wind for it, finding it, losing it again, taking more photos, scurrying to join the others on the next cauliflower.

JACK WRITES: We reach the summit at 1.45 p.m. in chill weather, and the 40-knot wind sends a fine hail of ice crystals up the backside of the mountain to rattle against our parkas. From leaden, the sky has cleared, as if to match our mood: it's now a brilliant blue, laced with wispy cirrus and a scattering of lenticular clouds.

Peter is astounded at the view stretching off in every direction — the treacherous rocks of the Straits of Magellan, the mountains all around. He and I constantly spot peaks we know. We are surrounded by the great mountain groups of the zone. Not far away looms the bulk of Mt. Burney, which Eric Shipton only succeeded in climbing on his third try. Far to the north are the towers of Paine, formidable even from 200 kilometers away. "Look", said Peter, "there's the highest point on Santa Inez Island!" "No, it's the one under the cloud." "Say, do you think that big dark one is Sarmiento?" We were as high as a trio of bibliomaniacs in a fine library.

I look closely at the "mushroom ice" that apparently caps all summits below 45º latitude. Probing the ice, my ice ax sinks all the way to the head. Yet when I cut into the depths of the mound, I find it isn't snow, but ice. I see the hard ice is in layers with poor, soft crystal between, giving almost no bonding. The ice ax simply poked through the ice lenses when I pushed it in.

This strange layering is probably due to the way the ice is formed: the warm, moist Pacific air hits these cold peaks, freezing into rime, or hoar — thrusting long fingers into the wind. As they grow, perhaps more crystals form on the fingers than between them. The results are these "cauliflowers", mounds of quasi-ice, hard and soft at the same time.

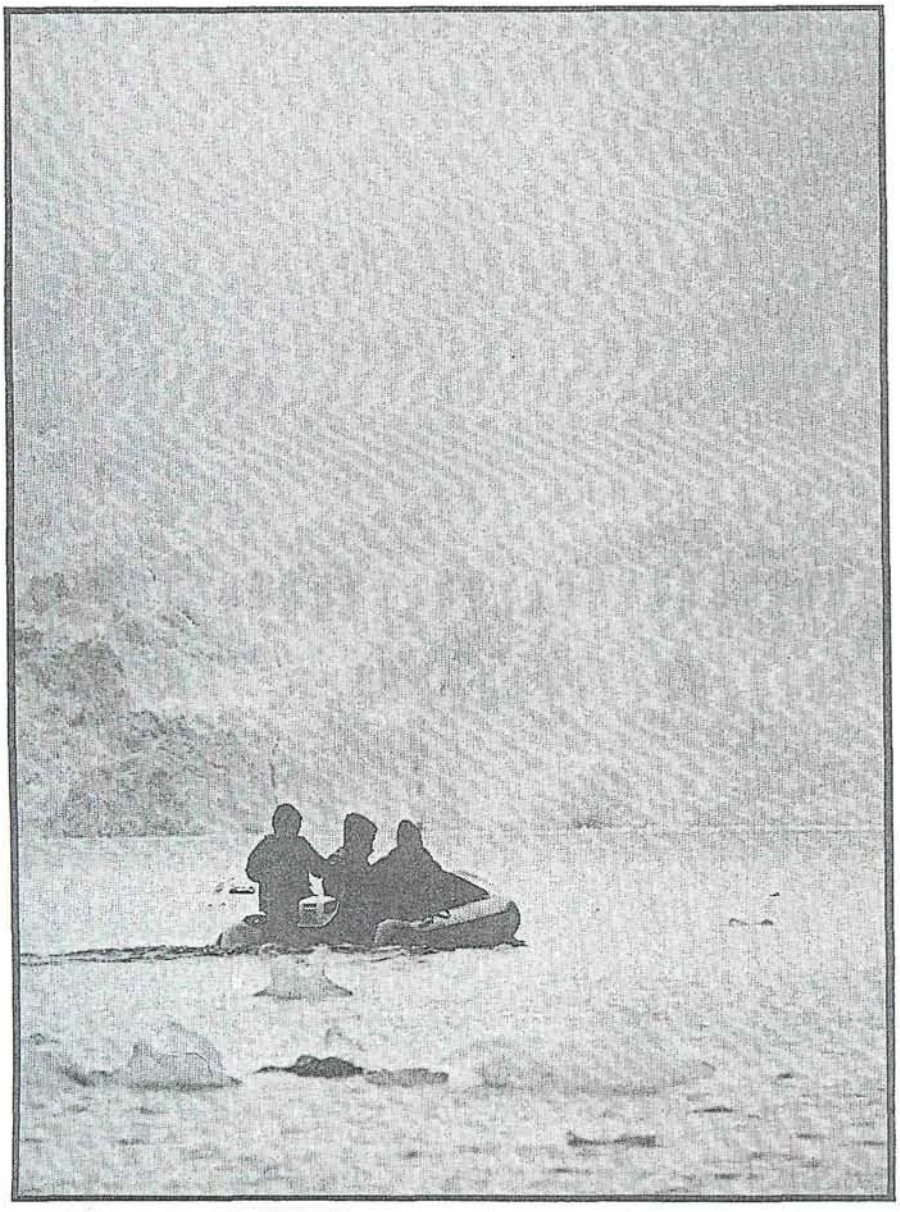
I have no idea how you climb the stuff. A conventional tube or ice screw would never hold. We joke about using an umbrella as a snow anchor: "It's simple, see. You stick it in closed, and it opens when you try to pull it out." "Right, and if it fails, you have a ready-made parachute..."

By now, the sun is fully out, and the Gran Campo Nevado gleams like the bottom of a gigantic bathtub. We are probably getting sunburned — an odd luxury in Fuegia. We down painkillers and Dexedrine for the long slog back and set off. The wind is at our backs. We are all pleased and feeling good about each other. Even the blunders that ensue while getting off the giant step seem more like a comedy of errors.

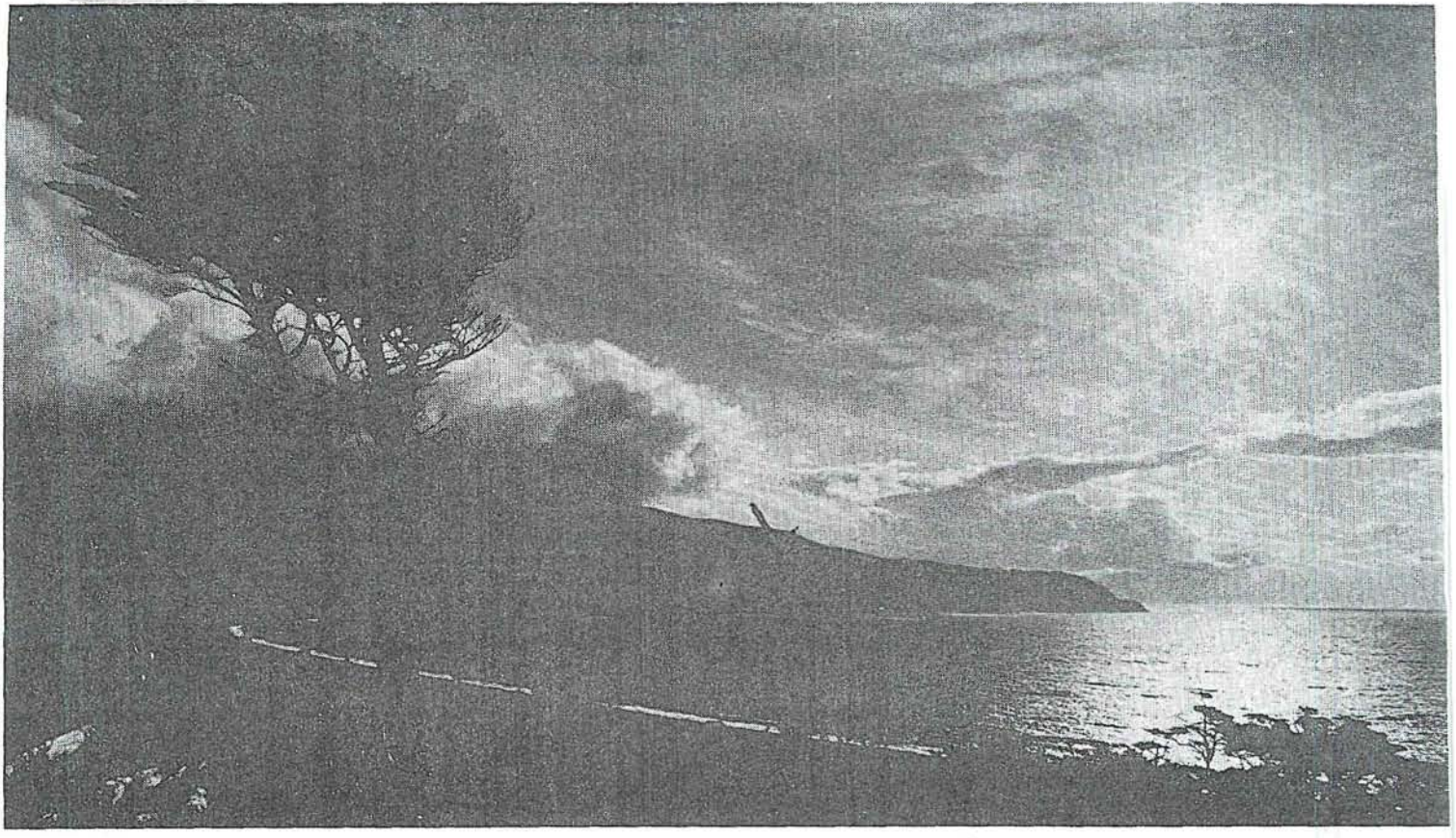
The wind picks up as we cross the snow dome, occasionally stopping us with bone-jarring gusts. We continue down to the tent. The yellow rainfly is flapping, half off, so we remove it and guy down the tent with the largest rocks we can find. I suppose we could pack up and descend, but Peter's knee is really painful, so we decide to stay.

The gusts are stronger now, probably 40 knots, and slam into the tent. We relight the candle constantly, and the wind blows the stove out a dozen times. We finally give up trying to cook. "Lucky there's no precipitation", I comment.

A moment later, the rain hits, blasting right through the nylon tent like fine spray from a shower head. William and I hurry into our waterproofs and go outside. Backs to the wind, we wrestle with the rain-fly. There are no lulls now, just a steady, unrelenting roar. Again and again, we try to slip the yellow demon



ICE WILDERNESS seen from the Canal Gajardo looking towards the Gran Camp Nevado near Iceberg Narrows.



THE BAY of Rio Caleta on Otway Sound, jump-off point for the Patagonian Canals Expedition

over the tent to lash it down, but it struggles away from us like a living thing. We have to shout to make ourselves heard over the noise of the flapping fabric. We lever our loaded packs against the windward side of the chaos and lean on them. We need time to think.

Our first notion is to get the hell out of there, but William is thinking more calmly. "We had some hard climbing on some of those steep parts, and that was in daylight with good weather. What makes you think we'd be able to handle them now?"

He is right, of course, and we decide to stay put under the collapsed tent and wait for morning. Settling in is another matter. We have to sit on ropes and pads to avoid the lakes forming on the tent floor: spray is still shooting through the walls, soaking anything we take from the waterproof sacks. Pulling on the wet clothes is disgusting, but necessary. Our clothes are either wool or dacron, and we need the warmth they will give us, even soaked. We put our rain-gear over everything, which keeps the water in, but at least protects us from the colder water sluicing in everywhere.

My feet are getting colder, but I know they will make it. We are all very considerate, helping each other with clothes, flashlight, and food. Great mutual kindness. As we doze off, exhausted, we begin to slump together; friendly, also warm. A small river runs in a venthole behind us, and out the front door. William sacrifices his small, hoarded ball of warmth and goes out to shovel drifting snow away from the tent. The night ebbs.

WILLIAM WRITES: At 4:30 in the morning, Peter wants to get cracking. This is a lousy place to hang around. Lulled by fatigue and misery that has become familiar, I don't want to hunt for my gear in the flooded tent, or face the weather again. I feign sleep. Peter insists. Regretfully, I come back into the present and look outside. It is calm now, but I have never seen an uglier sunrise. The whole sky is roiling with black clouds, pierced by one tiny patch of lurid, yellow phosphorescence. Very theatrical, I think; looks like a stage setting for Götterdammerung.

All the same, the wind is down, and the rain has stopped. First Peter, then Jack, gets his pack together. Reluctantly, I follow suit. When we emerge, the tent looks like a burst blimp. We gather it up, any which way. Nothing is missing, but one stout aluminum picket is nearly bent double. Some wind! We take another Dexedrine and a big swallow of honey; we head down, feeling we got off lucky.

At base camp once again, the sun comes out in a hot burst — painfully delicious on our sunburned faces. We strip off all our clothes and cavort around like Pans. Camp becomes a riot of color with drying gear hung on every line and twig. We cheerfully suspend food rationing for the day and stoke up on crackers. The place is good, and we love it.

The next weeks of the expedition were less dramatic, perhaps, but filled with peace. We spent whole days alone, silently walking over the rolling, boggy land in search of a portage route, feeling ourselves slipping into the minds of the old Alacaluf who walked this same ground, on the same quest. We became familiar with Fuegia, comfortable in her stormy arms.

"You came from ... there?" asked the old man, his shock of hair gleaming snowlike in the greyness. He points toward town, two hard days' sailing away. "No", we answer, shy and proud, "from back there ..." He nods, and wonders.

We found the old man and his wife at their homestead, as we sailed out of the last fjord. They had come in their youth, ax in hand, to push civilization to its limit. We had seen the signs of man as we neared his normal ranging-ground; an ax mark on a tree, a cut cedar stump, and the clincher — a cow pie. We landed on the beach, their beach, suddenly struck dumb after so many days away from people. The old couple, as shy as we, were slow to get over their surprise at seeing three yellow-slickered figures, as if dropped from another planet.

In a moment, we were seated at strange furniture — on chairs, at a table — drinking hot tea from chipped mugs. The old couple gave us much more than our first bread in forty days: they told us about themselves, about their children, about the winter when their salty fjord froze clear across. We nodded gravely, eating fresh-baked pie with what we hoped was dignity.

The day was wearing on, and we had to take advantage of the calm seas. Still, we lingered at the smooth board table as long as possible, feeding our hunger for warm faces such as theirs, for a warm place such as this. The woman smiled and showed us a picture of herself at age sixteen. She rarely leaves the homestead: we were about to go away forever. A thought crept in with the warmth of their hearth: we had travelled a third of the way around the world and spent 40 days in the wilderness to learn the secret of life — a rhubarb cobbler and a second cup of tea.

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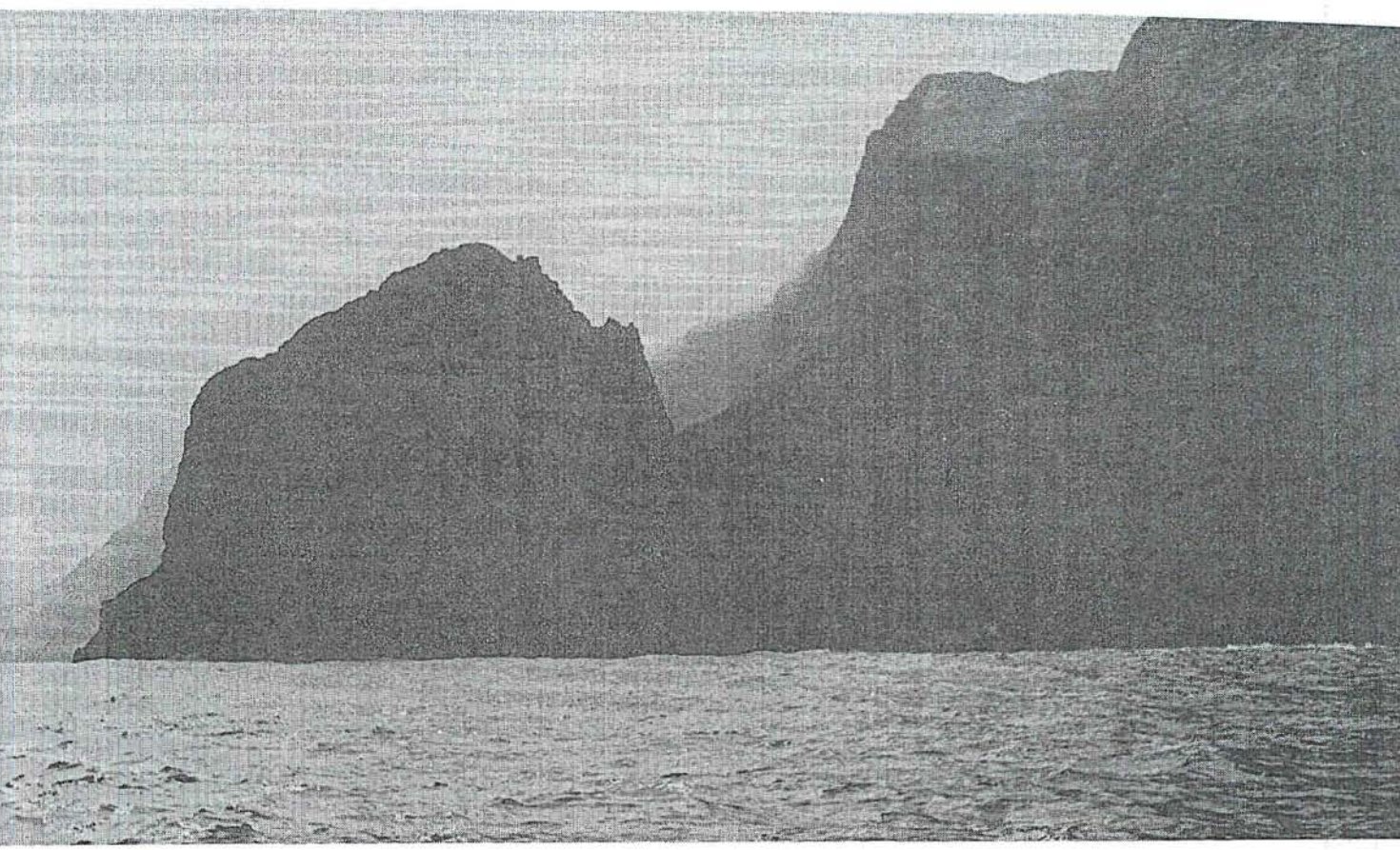


Marooned On Robinson Crusoe Island

by Peter Frost

PHOTOGRAPHS BY THE AUTHOR

THERE aren't any cannibals or mysterious footprints in the sand. In fact there's hardly any sand. But there are sunken galleons and pirate ships, palm trees and mountain peaks, a few wild goats, and of course, the Pacific Ocean.

This beautiful island was for more than four years the home of Alexander Selkirk, a Scottish mariner who chose to be abandoned here in 1704 rather than endure the miserable conditions on board his ship. He was left with an axe, a knife, a musket, some gunpowder, a bit of tabacco and his bible. Daniel Defoe heard the story, threw in a shipwreck, assorted dangers and hardships, plus Man Friday, and the famous castaway was born.

Selkirk couldn't have chosen a nicer place to be marooned. Food wasn't a problem — there are fish by the millions, and the island swarmed with wild goats in those days, they say. There's hardly anything that bites or stings, and the fishermen who inhabit the island are still complaining about the arrival of a few mosquitoes which first appeared some years ago.

In fact, the way they tell the story here, Selkirk spent his later years pining for the place and trying to get back — which may explain why he joined the navy again.

Robinson Crusoe Island is the tip of a solitary submerged mountain 700 kilometers west of Valparaíso, Chile. An island that used to be called Farther Out lies 180 kilometers farther out to the west. It's now called Alejandro Selkirk, and the two islands together make up the Juan Fernández Archipelago.

For years it was thought impossible to build an airstrip on Robinson Crusoe. The island thrusts out of the Pacific, craggy and wild, with high peaks and vertical cliffs dropping hundreds of feet to the sea. The islanders, 650 of them at the last count, had to make do with an erratic boat service.

NOWADAYS, things are a lot easier. TAXPA, a private airline based in Santiago, built a strip on a small plateau high on the western tip of the island, and the first aircraft to touch down came in 1966. These days TAXPA runs flights to and from Santiago on demand, from October to May, weather permitting. The round trip costs US$130.

If the weather is clear you first see the island about two hours out from Santiago. It's a dramatic, dark shadow on the lonely sweep of the Pacific. Closer in the pilot drops to the height of its tallest peak, the Cerro de Yunque — 915 meters — and makes a long smooth turn along the north shore. As the plane rounds the huge cliffs at the eastern point, you first see the wide bay and the steepsided bowl-shaped valley where virtually all inhabitants of the island live.

They call the bay, and the village, Cumberland. It is surrounded by eight mountains, overhung by the towering Cerro de Yunque. Visually, the nearest thing all this compares to, that I know of, is the area round Machu Picchu.

Rounding this clump of mountains, the plane follows the long, high finger of land that stretches out to the west, and circles over the barren, deserted island of Santa Clara towards the dirt landing strip high on the peninsula.

The man who looks after the airfield lives in a small house there with his family, the only people on this part of the island. He uses Robinson Crusoe's only car, a Jeep, to shuttle visitors to and from the bottom of the cliffs. There you are picked up by a launch which takes you to Cumberland.

That's the theory anyway. The man drove us down an incredibly steep track which zigzags down to a delightful little bay with cool, clear water which demanded to be swum in immediately. It was: we had time because there was no launch in sight yet.

Thirty minutes passed and still no launch. The man said something must have happened and he would drive us most of the way to Cumberland. There was a road, but we'd have to walk the last bit. "Half an hour," he said. "Downhill all the way."

We all piled back into the Jeep. After about 20 minutes we arrived at the end of the road, which is in a thickly wooded area below the main mountain heights.

For the first hour or so of "downhill all the way", we climbed an excruciatingly steep path which wound up the side of the mountain. It was hot, and most peo-

ple weren't really equipped for hiking. At last we arrived straggling one-by-one to the summit, a deep pass cut into the mountains. Cumberland bay lay far below us in the shade of the peaks as the sun disappeared in the west. This was Selkirk's lookout, I discovered later. From then on it really was downhill. An hour or so later, weary but enchanted with the place, we arrived in Cumberland.

LOOKING at Cumberland from the sea, it appears as though a great wheelbarrow full of houses had been tipped down the mountainside. Some stuck randomly on the way down the slope, and a big heap collected at the bottom by the shore. By the water front is a scattered bunch of sheds, boats under repair or just stored, boatbuilding workshops, and all the paraphernalia of a community that lives by fishing. There's a derelict building full of holes where they once made canned lobster paté, though it closed down so long ago nobody even remembers why.

All day, well into the evening, children and adults wander onto the jetty to dangle a handline and swop chat. The harbor serves as marketplace for the village. No one knows for sure (if you don't count Alexander Selkirk) when people actually started living on Robinson Crusoe Island: a book published in 1885 recorded 54 inhabitants.

Then as now, people are here for the same reason: lobster. Something about the sea around both of the Juan Fernández Islands makes life extra special for a lobster. Perhaps it's the sharp drop-away all around the shores, so that their normal deep water habitat is close to the shallow places where they like to breed. Anyhow, breed they do; the open season lasts eight months out of the year, October to May, and during that time upwards of 70,000 lobster wind up on the dinner tables of Santiago.

THE OTHER island, Alejandro Selkirk, has no permanent residents, but there is a small community of twenty fishermen who live there with their families and fish during the open months. All these people return home to Robinson Crusoe for the cold, stormy winter with its long nights, which, of course, is when lobsters mate, if that's the right word for whatever a lobster does.

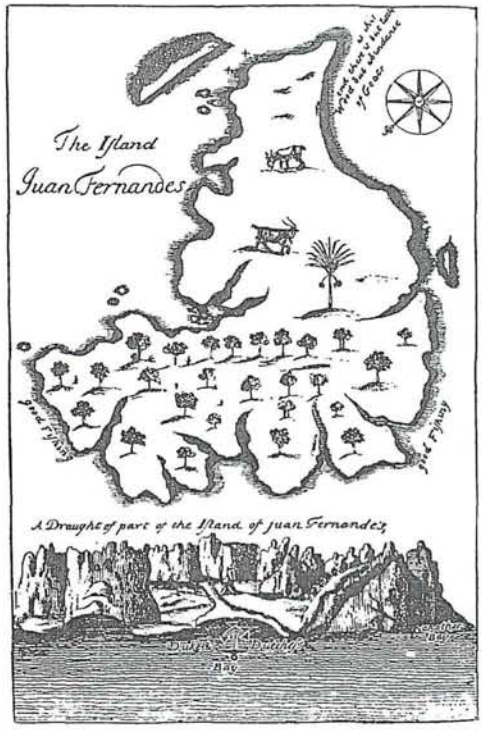
Some of the island's homes take in paying guests. I stayed with Dagoberto Paredes, who runs lobster boat No. 27 with Orlando, one of his seven brothers. Dagoberto chainsmokes through a cigarette holder made from a dried-out lobster's antenna and talks a blue streak.

Dagoberto is enthusiastic about the cooperative which the government set up ten years ago: "Things were tough here before," he told me. "The private company used to pay us whatever it felt like for the lobster, and the boat never came in winter. Sugar and tea, and all those things would run out, and you couldn't get a drink. All we had to eat was fish."

The day after I moved in, Dagoberto got a couple of mules and took me for a better view of Selkirk's lookout. Alexander Selkirk used to go up there every day, they say, to see if there was a ship anywhere on the horizon.

A mule gets up to the pass in about an hour, scrambling over moss-covered rocks. The path is sunken and narrow in many places, with steep banks. You have to fend off branches of blackberry, which grow everywhere. At the top is a small, grassy clearing, and to the left, about twenty feet up a steep rock, is a weathered iron plaque. It reads:

IN MEMORY OF
ALEXANDER SELKIRK
MARINER
A NATIVE OF LARGO,
IN THE COUNTY OF FIFE,
SCOTLAND
WHO LIVED ON THIS ISLAND
IN COMPLETE SOLITUDE
FOR FOUR YEARS AND FOUR MONTHS.
HE WAS LANDED FROM THE
CINQUE PORTS GALLEY,
96 TONS, 16 GUNS
AD 1704, AND WAS TAKEN OFF IN
THE DUKE, PRIVATEER,
FEBRUARY 1709.
HE DIED LIEUTENANT OF HMS
WEYMOUTH



Selkirk's Island. From an engraving of Mas a Tierra (Juan Fernandez) in Edward Cooke's "A *Voyage to the South Sea," 1712.*

AD 1728, AGED 47 YEARS.
THIS TABLE IS ERECTED
NEAR SELKIRK'S LOOKOUT
BY COMMODORE POWELL
AND THE OFFICERS OF HMS TOPAZE,
AD 1868.

The view from this place is, appropriately, stupendous, and one can well imagine why Selkirk spent part of each day climbing up here to scan the immense sweep of the Pacific, hoping for the ship that would pass by and rescue him. Looking across three snaggle-tooth peaks to the west, he would have seen, on clear days, the shadowy hump of the island that eventually came to be named after him, low on the horizon.

Wild goats used to roam the peaks in Selkirk's day, but they have been hunted intensively — every house seems to have a skull with long curly horns nailed to the wall. Those left are very timid and keep to the most wooded and inaccessible parts of the island.

NEXT DAY was a working day for Dagoberto Paredes. The fishermen go out three or four days a week to look at their traps, re-bait them, and bring in the lobsters. Each boat, run by two people, copes with about twenty traps which are scattered all around the coast. It's a full day's work, dawn to dusk, to get to them all.

Dagoberto had agreed to take me along, so we walked together down the hill to the harbor at six-thirty the following morning. It was still dark. On the quay I was introduced to Orlando, who was chunkier and a deal more taciturn than his brother. The first thing we had to do was to catch some fish for baiting the first traps.

"You don't have much luck catching fish," observed Dagoberto. He was pulling in his fourth while I was striking fruitlessly at bite after bite. The bay is alive with fish, nonetheless.

After dawn, the sun lifted out of the cloud banks on the horizon and stayed out. By noon it felt like we were being dry-grilled under a slow flame. The Pacific heaved and dipped — it was calm enough by local standards, but there's heavy swell at the best of times, and the boat would rock crazily whenever they hauled in the traps. I took to untangling lines, baiting hooks; anything to distract me from the fact that I was feeling pretty sick.

It's hard work, lobster fishing. The traps lie in 200-300 feet of water — just a few hundred yards off-shore — and they are hauled in hand-over-hand. They are box-shaped, about five feet long by two wide and deep, made of thick sticks nailed to wooden struts. Waterlogged they weigh a lot.

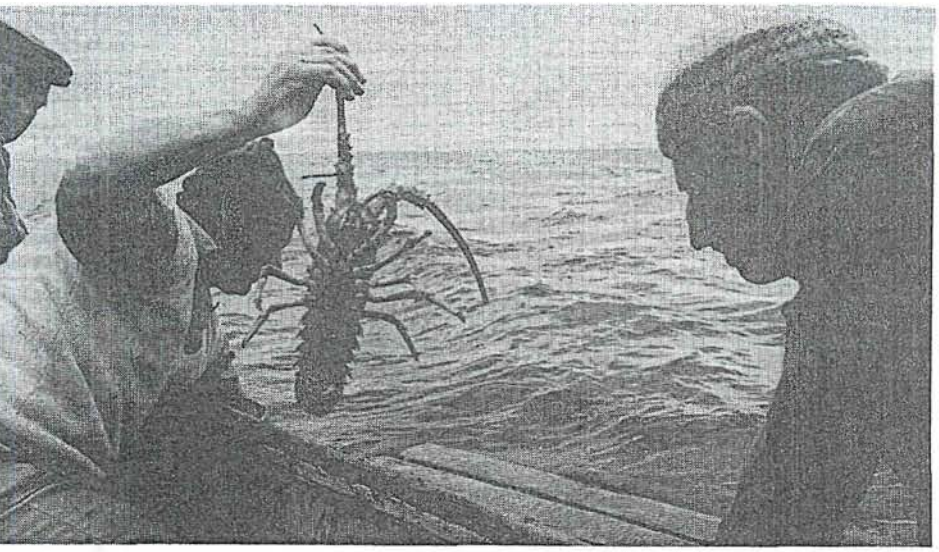
At about trap six or seven, things started looking up, and the wooden box amidships began to fill up with healthy-sized lobsters. Orlando made **cebiche** from a couple of the smaller ones; mayonnaise, onions, pepper, lots of lemon juice — and raw lobster. All of it; the guts, everthing. Not the shell of course.

"You look seasick," said Orlando. "Here. Have some of this." "Er... thanks." Under other circumstances it probably would have tasted rather good.

The bait-fish situation remained precarious all day. Towards evening we had to stop and throw handlines because we had nothing left for the two remaining traps. Nothing bit. Since this was almost unheard of, Orlando looked at me suspiciously, sniffing bad luck. "If this goes on," said Dagoberto, "we'll have to use him instead of fish."

It did, but they didn't. In the end we had to leave the last two traps for the next day. Still, the lobster haul had been good: there were 54. An average day brings in about 30-35, according to Dagoberto.

THE EARLY history of the island was somewhat colorful. It became at first a base for pirates raiding Spanish ship-



FISHERMEN with one of the famous lobsters of the island. In an average day they bring in 30 to 35

ping. In 1680, an English corsair, Bartholomew Sharp, made a landing at a small bay north up the coast from Cumberland which is now called, after that event, Puerto Inglés. Sharp was chased off by the Spanish, as was Edward Davis, a Welshman who put in six years later with two frigates and his flag-ship, "The Bachelor's Delight."

These and other pirates who passed through have inevitably led to talk of buried treasure. Even Sir Francis Drake is supposed to have called by, if you believe the talk you hear, and of course everyone knows he left a hoard buried.... somewhere.

But there is one piece of loot stashed away that is known to exist for sure. Eight years ago came some visitors connected with those "Far Away Places" ads put out by the Canadian Club Whisky people. They hid a crate of their product in one of the hundreds of caves in the cliffs around the island.

No one's found it yet, but if you do, then you get the crate, of course, plus US$500 and another free crate every month until your liver gives out. Local people say that the men hired a boat and spent two days around a particularly cave-infested stretch of shoreline opposite Santa Clara. Thus, they speculate, the whisky must be hidden around there somewhere.

Behind and above Cumberland sits a big stone fort which the Spanish eventually built to keep off the pirates. At the back of the cemetery is a small, well-kept memorial donated by the German Community in Santiago — an anchor with a lifebelt over it — which commemorates an incident in the island's more recent history. The German cruiser "Dresden", which had escaped after the Battle of the Falklands in 1915, was hove to in the bay when the British cruisers "Kent" and "Glasgow" turned up. Some say that the British sank her with gunfire, others say that the crew scuttled her. Either way, when the Chilean navy arrived to remind the protagonists that Chile was neutral and would they please go and shoot it out somewhere else, the "Dresden" was in 150 feet of water at the bottom of the bay.

The British said frightfully sorry to the Chileans, or words to that effect, but when the next war came along, Robinson Crusoe Island was ready with a battery of guns, courtesy of Krupp of Essen. They are still there now, abandoned; four small turrets, curiously exposed and rather incongruous on the shore. Someone has painted them sky-blue.

PEOPLE HAVE been getting marooned on Robinson Crusoe Island almost since Juan Fernández discovered it, around 1570. It wasn't just Alexander Selkirk, the prototype for Daniel Defoe's castaway, nor was he the first. According to a booklet on the history of the Island an English pirate abandoned nine members of his crew there in 1686, and they weren't picked up — it says — until 1698 (a misprint, perhaps).

There was Selkirk himself from 1704 to 1709. Then the entire crew of two more English ships were stuck there for five months after they were wrecked in a storm in 1721.

Nowadays, it doesn't take so long to get away, but it can still happen. It started when I was there with several days of high winds. Conditions at the airstrip didn't permit flying, so the backlog of people waiting to leave grew to about thirty.

Sunday evening it started to rain. I'd moved a half mile away from the village into Hotel Pangal. A gloomy visitor already several days overdue back in Santiago stared at the rain battering the windows.

"No flights tomorrow", he said morosely. He was absolutely right about that. It rained, it poured, and it went on pouring all night and into the next morning. At about 10 a.m., the first avalanche came.

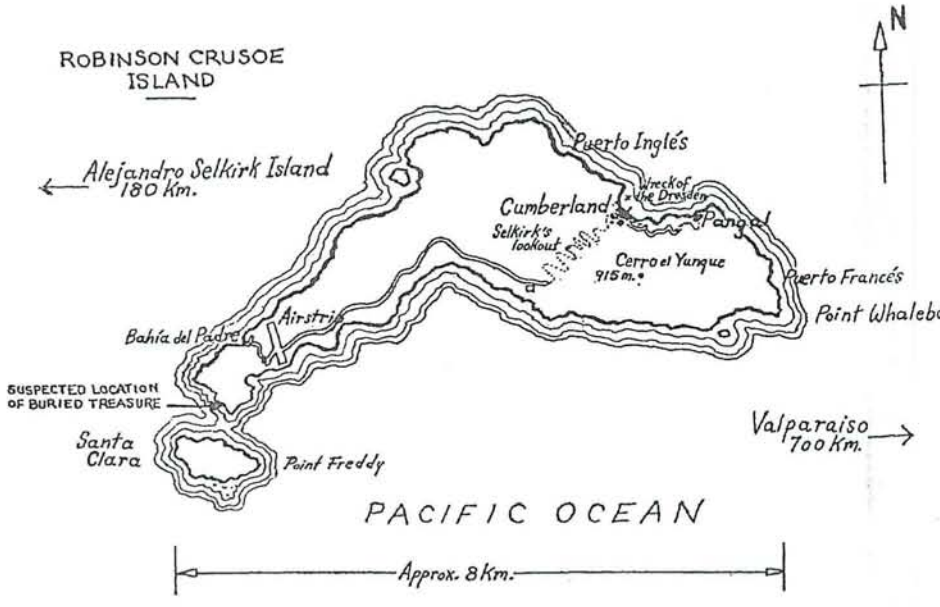
The Pangal is built in a rock outcrop fifty feet above the seashore. To one side and well below there is a stream, and close to the building on the other side is a deep gully which is normally dry.

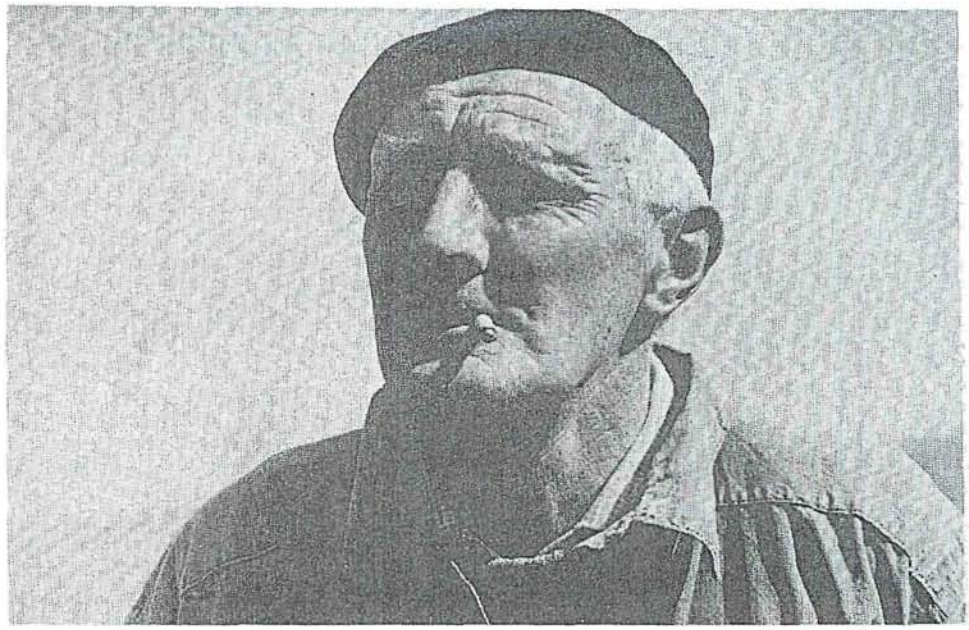
Well, it filled up of course, and loose mud and rocks on the mountain behind shifted and came rushing down the gulley. The first time this happened, it stayed within the gully; the second time there was more, and it didn't. It swept under the wooden piles which supported the room at the end of the building. By this time, the couple in this room were hastily removing their belongings.

An Argentine man in the next room, who later explained that he was impervious to external stimuli while under the influence of literature, remained in bed reading.

The third and final avalanche was the biggest of all and ripped the recently-evacuated room clean away. I was standing in the dining room when this happened, and I had to flee with several other people when a black tide of mud came surging up the corridor and across the floor.

That was it! Everyone grabbed their things and evacuated to two small cabins which were on higher ground. The bibliophile had to wade out through the mud after his narrow escape and remained in a parlous nervous condition, literature or no literature, for the next few days.



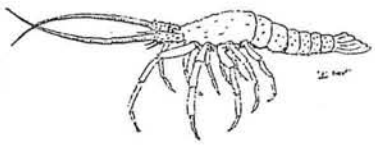


"If this goes on, we'll have to use him instead of fish"

WHILE all this was happening, the village was getting it, too. The main street running down the hillside had become a torrent, and uprooted trees, tumbling boulders and debris had smashed half a dozen houses to pieces. Many more had been flooded. The waterfront was awash with mud. Everyone had time to get clear, though, and there were no casualties.

In the afternoon, after it had stopped raining, I walked along the road to Cumberland. I could see great waves thrashing at the shore by the village, and the bay, usually blue and clear, was a dirty brown color. From the small inlet by Pangal a wide slick of debris stretched way out to sea.

The amount of flotsam on the shore was something to marvel at. Heavy seas had done as much damage as the rainfall. Of the boats moored in the harbor, three were still afloat. Several had turned turtle, and their outboard motors had dropped out and sunk. Still more had been washed ashore.



Finally, though it hadn't rained so hard on the other side of the island, the airstrip was out of action. The visitors — us — were marooned.

Back at the hotel a kind of blitz spirit prevailed, and the guests were working away helping to clear up the mess, which was considerable. Sadly, the food store had been flooded, and we were reduced to a rather tedious diet for the next days.

Meantime, the ether was buzzing. The manager was in touch by radio with Santiago. The Ministry of Interior was "aware of the situation" and "measures would be taken." Tuesday's papers in Santiago said that the hotel was totally destroyed, the village mere debris, and the island awash from end to end.

Three days passed. Rumors gained ground and lost out to even wilder speculations: "The Navy is coming" — "The entire island will be evacuated..." — "...by a fleet of helicopters" — "There's another storm coming, worse than the last."

Fishing became a serious business. Meanwhile, the broken water pipe was repaired, and there was a joyful flushing of toilets.

THURSDAY morning, we had definite word at last that the naval transport "Piloto Pardo" was coming with emergency relief materials and would be evacuating everyone who wanted to leave. About midnight the lights of the ship appeared, and the manager of the hotel produced three surviving bottles of champagne which he'd been reserving for such an occasion.

The captain of the ship came by the next morning. We would all be taken back to Valparaíso, he said. The accommodations were not first class, but (apologetic shrug) there it was.

The "Piloto Pardo" spent the day unloading relief supplies, mostly building materials. Navy frogmen helped recover some of the outboard motors which had been lost during the storm.

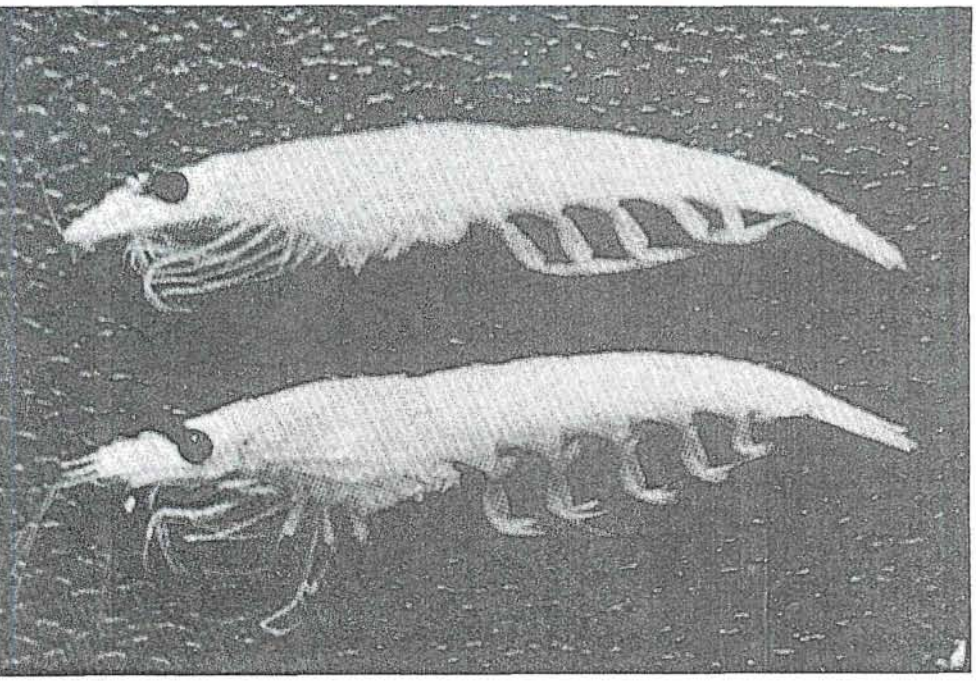
That night the sailors let down floodlights over the sides and the stern of the ship. Then they threw out handlines for the fish. A festival atmosphere developed as they pulled in great brutes — some of them weighing 15 to 20 kilos — and men shouted with triumph as they clobbered the flapping monsters on the deck. The rails were crowded with people jostling each other to throw out lines. One person was leaning over the edge of a gangway close to the water, trying to shoot fish with a harpoon gun.

At midnight the engines started up, the ship tooted a couple of times, and we left Robinson Crusoe Island. It was definitely the right ship — the appropriate ship — to be rescued by. No other in the Chilean Navy, or indeed any navy, could have been less ruffled by the upsetting presence of more than a hundred disorderly civilians aboard ship. Men accustomed to nudging icebergs and dodging falling icicles as they splinter from the frozen rigging weren't likely, either, to be fazed by the sight of a small child urinating on the floor of the officers' mess. All in all, it was rather jolly.

It had been a week since the cyclone hit Robinson Crusoe, another world hundreds of miles behind us. It rained 16.4 centimeters — more than 12% of the island's average annual rainfall — in a single night. A freak: there had never been anything like it there before.

It's hardly likely that it will happen again in the foreseeable future. Still, it might make a good ad: "Visit Robinson Crucoe Island — sun, sea, fishing, buried treasure. Marooning still a possibility." □

THE CYCLONE. Huge waves fill the shores of Cumberland with smashed fishing boats and debris. The coast was swept with heavy seas for days.



SCIENTISTS have estimated that a yearly catch of 70 million tons of krill could provide 1,000 million people or ¼ the world's population with 20 grams of animal protein every day.

Let Them Eat Krill

by Hugo Scarone

PHOTOGRAPHS BY THE AUTHOR

AS food reserves dwindle in a world that has not learned to control its increasing population, a smallish red shrimp that inhabits the seas around the South Pole is receiving special attention.

Krill — a Norwegian term meaning "little fish" — is a remarkable creature. Thriving in enormous numbers in the icy seas of the Antarctic, this small crustacean is not only the principle food of whales, penguins, seals, and other animals, but an important link in the earth's ecosystem which provides us with the air we breath.

The krill population in the southern seas has multiplied dramatically over the past 50 years. Inhabiting vast areas, swarms of krill will soon be unable to feed their astronomical numbers. Like the locust they resemble and with an appetite as voracious, the sheer bulk of krill poses a threat to the microorganisms in these waters. Unchecked, krill growth will tip the precarious ecological balance bringing death to countless numbers of fish and other life forms.

American scientists now estimate the Antarctic krill stock at 500 to 1,000 million tons. The Russians put the figure considerably higher — between 800-5,000 million tons. Australian and Argentine scientists have estimated that a yearly catch of 70 million tons could provide 1,000 million people or ¼ the world's population with 20 grams of animal protein a day.

Krill is almost certainly the greatest source of animal protein left in the world today, and to some, represents a vast supply of food for man and livestock just waiting to be harvested. Astonishingly rich in protein, 10 grams of krill equal 200 grams of beefsteak.

In this setting, krill has been called an undreamed of windfall — a way of staving off global starvation almost indefinitely. With the world's fish catch falling in recent years to below 70 million metric tons annually, krill comes like an unexpected gift and just in time. Intensive commercial exploitation of krill could easily double or treble the yield of all the world's fisheries.

BUT THE truth about krill is less rosy. In itself, the krill boom testifies to an already existing ecological imbalance of mammoth proportions. As the nations of the world maneuver to cash in on krill, it is necessary to point out that the overwhelming abundance of these crustacea is the result of fifty years of international mismanagement, the undeserved bounty of long-term ecological arrogance.

In half a century, whalers reduced the world's whale population by 90 per cent. During this period, scientists have plotted a corresponding growth in krill, the favorite food of many species of whale including the "blue", the largest creature known to have inhabited the earth. While an international agreement now puts several varieties of whales off limits (blue, humpback, right, bowhead, and grey), and sets quotas for others, the treaty is voluntary and not enforceable. Moreover, it only applies to signatory countries, leaving at least twelve nations free to hunt whales at will. Perhaps these controls have come too late to save the whale and therefore restore the krill balance. Without reliable information on whale populations, numerical estimates of whole species is largely guesswork. It is only certain that the slaughter of whales continues (27,939 is permitted by international agreement), and no one can say how long it takes to replace these losses.

The riotous increase in krill is in inverse proportion to the decimation of the whale population. Before large-scale whaling depleted their numbers, blue whales alone accounted for more that 200,000 animals. Now less than 6% survive and figures for several other krill-eating species are similarly grim.

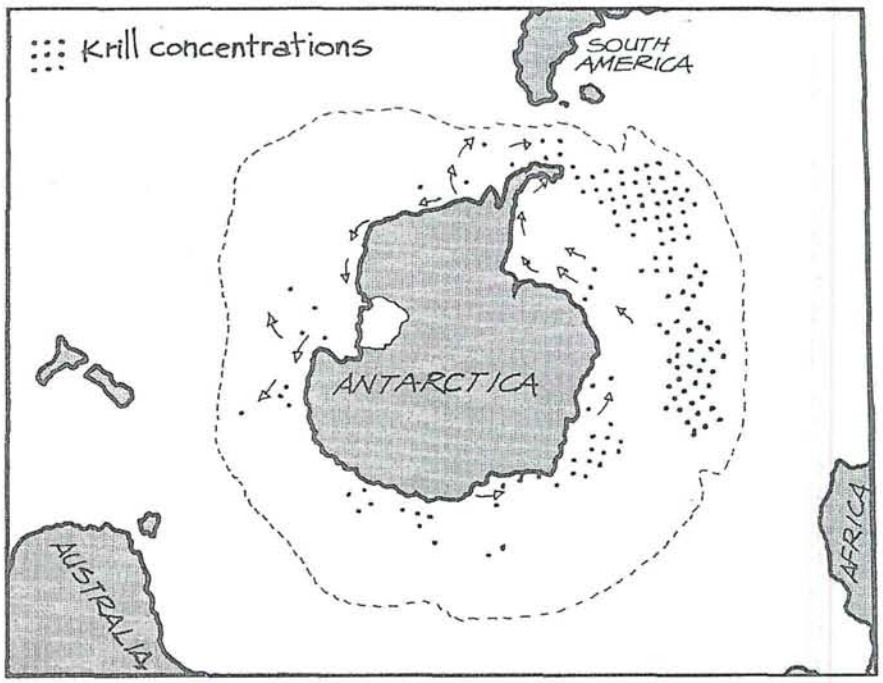
It takes sizeable whale population to keep krill within manageable limits. In strength, of course, whales accomplished this with ease. One full-grown blue whale, for example, can devour 4 to 8 tons of krill a day. Before the wholesale slaughter during the 20th century, herds of Antarctic whales alone consumed some 150 million tons of krill daily.

It is too early to say if the blue and other whales face ultimate extinction but their drastic reduction through whaling has presented the immediate problem of what to do with all the krill. Obviously it must be harvested, but by whom and in what quantities to avoid yet another ecological disaster?

SINCE A large portion of the world will soon be eating krill in one form or another, it's time we learned more about this shrimp.

"Krill were so numerous in Captain Cook's time," says Dr. Aldo Tomo of the Marine Biology Department of the Argentine Antarctic Institute, "that Cook first mistook them for sandbanks. Sealers in 1821 observed large concentrations of krill and noted it was a favorite food of penguins and whales. Explorer Wilkes described krill as living red islands, and in 1904, Storling recognised their ecological importance for whales, fish, and birds."

Krill is represented by some 90 species, but the most numerous in the Antarctic is **Euphausia superba Dana,** living in the East Wind Drift waters, Weddell Stream, Gerlache Straits, and near the South Georgia Islands. The adult **E. superba,** about the length of a man's thumb

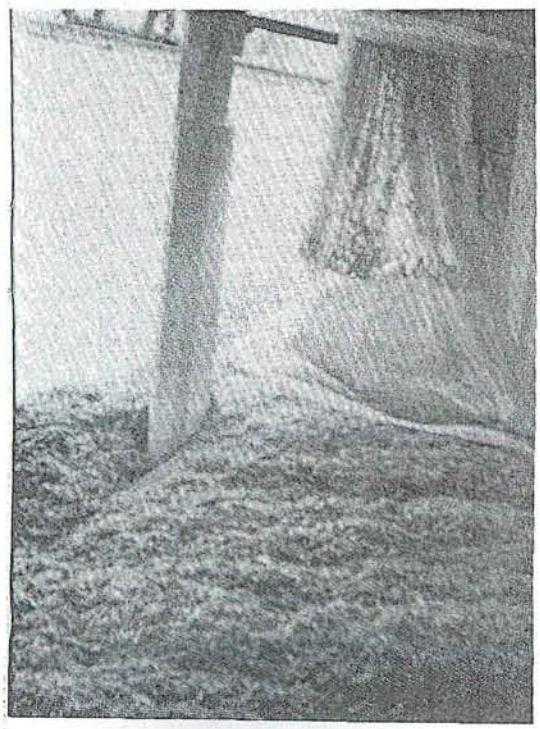


LAST YEAR the Russians took an estimated 200,000 tons of krill from the Antarctic (see krill distribution map at right). BELOW: Krill swarms are located with echo-sounding equipment and harvested with nets and vacuum pumps which suck them directly aboard the ship.

(60-70mm.), is equipped with two antennae, and five pairs of hairy legs for swimming (these also double as food strainers). Red-orange on top and bright green underneath, the individual has seven pairs of light organs along its body, so arranged that with a flick of the abdomen it emits a bluish-white light. It glows when alarmed.

Krill spend their lifetime of 2½ years travelling the seas in vast shoals. Rust-red krill splotches, measurable by the acre, patch the ocean surface. There are some 30,000 krill per cubic meter which can mean from 5,000 to 100,000 tons of krill in a swarm.

Krill's chemical composition is as follows: moisture 72-84%; fat 2-6%; protein 13-18%; and ash 2-3%. It contains a variety of vitamins, mainly from the B group, and many fundamental amino-acids such as glutamic acid, lisine, and leucine.



This small shrimp exhibits a well disciplined social behavior. In normal swim formation, all heads point in the same direction, the parallel bodies separated from one another by two centimeters. The swarm, feeding on microscopic organisms near the surface, appears to move as one massive individual. To avoid head-on encounters with objects, the whole formation can shoot backwards in unison. Krill migrate vertically, settling down around 18 meters beneath the surface at night.

All members in a swarm are the same age, hatching from a single egg cloud laid by a parent swarm. The male-female proportion is roughly 50-50. Group sex seems to be the norm in the Antarctic summer; during speedy copulation, the male transfers a pair of sperm bags (spermatophores) to the female through an egg pouch on her body. The eggs, when ripe, pass into the pouch to be fertilised. The male then swims off to die while the female sheds more than 11,000 eggs which sink to depths of as much as 1,500 to 2,000 meters. There they hatch and begin a slow ascent to the surface and adulthood, passing as they rise through four different development stages known in order as the nauphlius, metanauplius, calyptopis, and furcilia. Krill winter near or beneath the Antarctic ice-pack, multiplying with the summer bloom of plankton in nightless days.

FOR MANY years, scientists around the world have speculated on krill as a potential food source, but until the seventies, only the Russians seemed to take the matter seriously. In 1964, the oceanographic vessel "Akademik Knipovich" sailed into the Antarctic to catch krill. Then in 1970, the Russians began marketing "Koral" — krill butter and krill cheese — and "Ocean" krill paste, "in food value and flavor quality ... similar to shrimp". The paste is used to enrich meat pies, fish balls, salads, paté, and devilled eggs. Those who have tried it say that krill tastes like shrimp or crayfish, having perhaps a somewhat more "concentrated" flavor than other well known crustacea.

The Russians also claim that krill paste possesses medicinal properties. They report a 60% increase in the cure rate among stomach ulcer patients treated with krill paste. Favorable effects have been noticed with common diseases such as atherosclerosis.

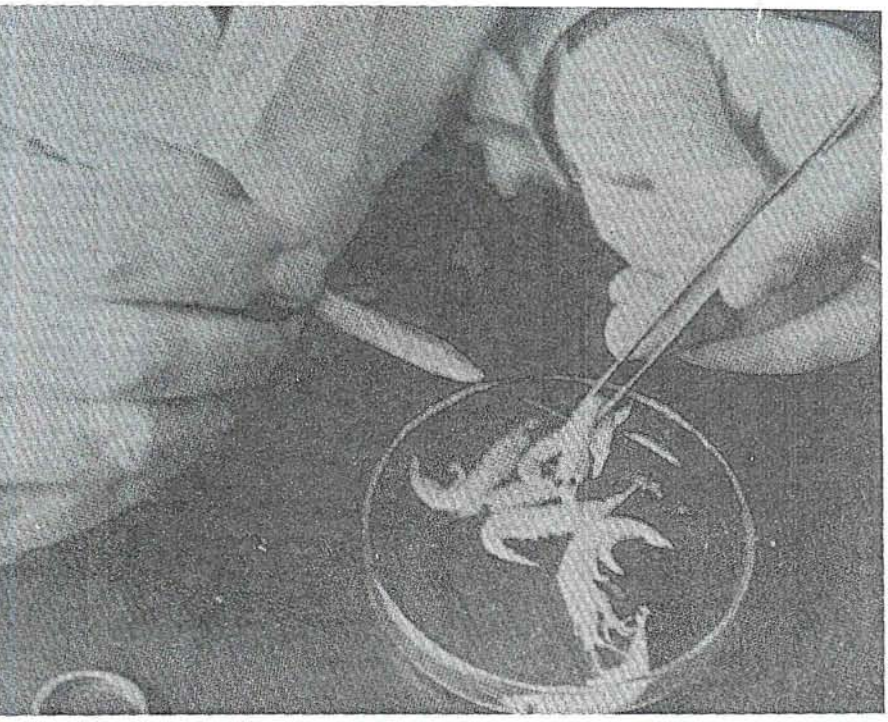
Finally, Russian experiments have demonstrated that animals fed krill paste show a notable increase in weight and hemoglobin over animals fed on beef.

The Japanese are testing krill in frozen fishcakes and dumplings, as a liquid protein for flavoring snack foods, soups, and pet foods, and as a protein concentrate. Japanese researchers suggest adding the concentrate to bread, spaghetti, Indian chapattis, Mexican tortillas — an all around supplement to carbohydrate foods.

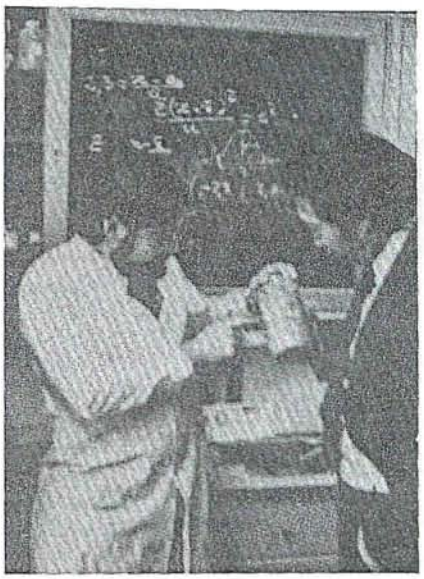
Of course man is not the best krill catcher. Whales do a much better job locating them thanks to the little shrimp's phosphorescence and by means of the whale's natural sonar system, scooping up to a ton per mouthful. Japanese and Russians have had some success in locating krill with echo-sounding equipment, catching them with different kinds of nets, filter devices, and vacuum pumps which suck the krill directly aboard.

Last year the Russians took an esti mated 200,000 tons of krill from the Antarctic. The Japanese, their closest competitors, 646 tons. Polish trawlers have been hauling in krill since 1972.

In the next few years, Argentina could well become the major consumer and exporter of krill. The largest concentrations are located in Antarctic waters claimed by Argentina, only three days' sail from Ushuaia, the southernmost port in the country.



SCIENTISTS studying krill at the Antarctic Institute in Buenos Aires.



This is only the beginning. The race is on. Using the most sophisticated scientific equipment and unfettered by international agreements, the world's fishing nations are gearing up for intensive commercialization of krill — lured on by a huge market and profits.

Man must now eat krill. It is a protein source too valuable to waste in a world plagued by ever increasing famine. But krill is not an inexhaustible resource. It is important to understand now the dangers that lie ahead if krill harvesting is not carefully controlled.

TROPICAL SEAS are vast, barren areas compared to the rich polar waters which contain 10 times more life. Colder seas absorb oxygen, carbonic acid, and other essential nutrients more easily, and their more unstable nature helps circulate these life-sustaining elements. Together, phytoplankton and krill, which abound in these conditions, constitute a crucial factor in the maintainance of the earth's supply of oxygen.

Krill is not only the food of many whales, but of many penguins, albatrosses, terns, petrels, and numerous species of fish and squid. Many of these creatures depend almost entirely on krill for food in what is called a "trophic chain". The importance of krill as a main link in the south seas trophic chain is underlined by Dr. Tomo: "Every living being requires, transforms, and therefore contains energy. Krill feed on seaweed, thus becoming a first rate source of energy since seaweed gets its energy directly from the sun. As an organism moves away from the source of energy, more is lost. Thus, the less mediators the better, since 90 per cent is lost at each stage".

Krill is a privileged little animal in matters of energy. To illustrate energy loss in the trophic chain, ten million pounds of phytoplankton is needed to produce one pound of tuna. In the case of the whale, the energy transfer is more direct, moving from tiny photosynthesizing organisms, to krill, to the largest of mammals.

An intensive krill harvest of around a million tons annually may affect the balance negatively. If man is greedy and overharvests krill, he will certainly threaten the survival of many varieties of Antarctic life with unforseeable consequences to the whole world.

The cycle is now coming under careful study and was a main topic in the most recent sessions of the Scientific. Committee for Antarctic Research (SCAR) held in Argentina. Presently, the Antarctic Institute in Buenos Aires is studying the possibilities of krill as food and ways of harvesting it without altering the Antarctic ecosystem.

Commercial krill exploitation is inevitable, but this time man must avoid committing still another ecological error. In our delicate ecosystem, senseless overharvesting of krill will this time mean more than just another irreversible blunder. It may well mean our own destruction. □

EXPLORERS CLUB BOOKLIST

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GUIDE TO LIMA — by J.E. Maguiña. US$ 2.40, S/.165.

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THE STOLEN CHIEF — by Manuel Córdova-Ríos and F. Bruce Lamb. The true story of a youth from Iquitos who was captured and became the leader of the Amahuaca Indians. US$6.37, S/.516.

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THE FOUR SEASONS OF MANUELA — by Victor von Hagen. US$4.42, S/.358.

SOUTH AMERICAN MYTHOLOGY — by H. Osborne. US$9.49, S/.769.

WHERE THE INCAS TROD — by Wallace G. Carter. US$13.21, S/.1,070.

FODOR'S SOUTH AMERICA — US$10.52, S/.852.

ANDINISMO Y GLACLIOLOGIA — by César Morales Arnao. US$1.68, S/.136.

NUCLEAR POWER AND THE YANOMAMO

SOME STORIES never die: they just change locations. Once again, progress has run head-on into the Indians. A hundred years ago, the scene was the United States, the scenario one of covered wagons filled with settlers, angry Indians on horses, blue-coated cavalry set against a backdrop of majestic mountains and endless prairies. Today, the location is Brazil, the actors uranium prospectors with sophisticated gear, confused, unarmed Indians in dugout canoes, and a government agency which vascillates between abetting and halting the extermination.

One of the largest tribes still holding on to their traditional manner of living, the Yanomamo have a population of approximately 20,000 spread throughout the Brazil-Venezuela border area. They live in hundreds of small settlements in the jungle region between the Orinoco and Marauia Rivers. Also known as the Yanoama, Xiriana, Guaharinbo, and Waika, these natives once ranged over a much greater territory. In the last century, they were squeezed by the Brazilian rubber collectors from the south and the Venezuelan ranchers in the north. Then they were left more or less in peace for a century along the unwanted border area.

The area is no longer "worthless" — it is now integral to the nuclear age. Exploration, which did not begin until 1970, culminated in the discovery in 1975 of the world's largest uranium field. Project Radam, a $7 million aerial photographic survey, located the field near the Surucucu mountain territory of Roraima. Using infra-red scanners and radar, the Brazilian government obtained a detailed analysis of the soil and subsoil of 4.5 million kilometers in the Amazon and northeast regions.

In November 1975, Brazil signed a pact with West Germany to secure nuclear technology and assistance for 80 years in exchange for raw nuclear material. Sixty-three nuclear generating plants are scheduled to be built, costing $50 billion. Brazil is well on the road to utilizing its nuclear resources.

To facilitate the transport of the uranium, tin, and, other valuable minerals found in the area, the 3500-mile Northern-Perimeter Highway is being constructed. While this road takes natural resources out of the Indian's land, it repays them by disrupting their way of life with the introduction of prostitution, alcoholism, and diseases formerly unknown to them. Epidemics of tuberculosis, venereal diseases, influenza, and measles are helping the miners decimate the Yanomamo.

The greatest bad joke played on these people by their exploiters, however, is the resulting epidemic of African River Blindness (Onchocerciasis) which is blinding them at an alarming rate. The disease, carried by black flies, was introduced as a direct result of the road construction. The developers cleared away the trees, which in turn drove away the fly-eating birds. Coupled with poor sanitation methods used by the small army of road gangs, the flies ran rampant. The disease is considered too expensive to combat, although the Northern Perimeter Highway itself is costing millions a year to construct. This is also the area where $50 billion is to be spent on nuclear power plants.

The possibility of an epidemic was predicted by the Brazialian National Indian Foundation (FUNAI) as early as 1973, but they were ignored. According to the president of FUNAI, General Ismarth Araugo do Oliveira, the only prevention is an expensive French vaccine, but it might kill the Indians due to their lack of resistance to the side effects. FUNAI stated that more than 11% of the Yanomamo population has died as a direct result of the road construction.

FUNAI, which is in the ambiguous position of representing all government agencies dealing with the Indians, is both friend and foe. While it promotes the development of the Indian lands, it also tries to appease the defenders of the Indian cause. It did set up an emergency program to provide health care for the Yanomamo to be headed by an American anthropologist. Unfortunately, the project was halted by the Ministry of the Interior which decided to stop foreign anthropologists from working with Brazilian Indians because of "national security"

PROTECTING PODOCARPUS

ABOVE the sweltering Amazon Basin on the eastern slope of the Andes clings a stand of rare evergreens — ulcumanos **(podocarpus spp.)** — with leaves one meter long. The ulcumanos are situated in the Province of Oxapampa, Peru, in a transition zone unique for its dramatic land forms and a wide variety of ecological niches. Other rare and endangered species which still thrive here in significant numbers are the jaguar, puma, tapir, deer and motmot.

Anthropologist Richard Chase Smith is looking for institutional and financial support to preserve a large tract of this land through the creation of a National Reserve.

Dr. Smith's plan would also serve to protect sixteen Amuesha Indian settlements (400 families) which are located on the easternmost boundary of the proposed Reserve. Although twelve of these settlements have received title to their land under the Native Communities Laws, a continuing influx of settlers into the area will soon force the Amuesha to make a sudden adjustment to the civilized world.

To prevent the disintegration of this lifestyle, Dr. Smith has suggested that a single expanded Amuesha territory be established on the border of the Reserve, and that a buffer zone between the two be set aside granting the Amuesha exclusive rights to hunt, fish, and extract traditional forest resources. The plan, if enacted, would empower Amuesha leaders to check illegal hunting and logging since the only access to this forest is through Amuesha territory.

AMAZON PALM READING

THE SHIPIBO are one the largest surviving riverine Indian groups in the Amazon, and their culture represents a successful tropical forest adaptation. However, the continuation of their traditions is now threatened by encroaching development.

John H. Bodley, associate professor of anthropology, and his research assistant, Foley Benson, both from Washington State University, are presently conducting a year long field project with the Shipibo Indians on palm cultural ecology in the central Ucayali region of eastern Peru.

Palms are a vital part of the Amazon forest ecosystem and a critical natural resource for the Shipibos and other jungle inhabitants, yet little detailed information is available on their cultural-ecological role in an aboriginal culture.

Surveys carried out during the first two months of research have revealed a surprising abundance of forest palms. As many as 11 species and over 100 individuals of all sizes have been counted in a single plot 10 meters square. While some important species are becoming scarce, others are being deliberately managed by the Shipibo and may be considered semi-domesticates.

The primary objective of this National Science Foundation supported research is to document precisely how the Shipibo utilize palms and record their pratical knowledge of the palm taxonomy and natural history. At the same time detailed information is being obtained on the distribution of palms in varied zones and their growth rate in order to assess the availability of the palm resources in relation to present and future Shipibo needs.

Palm specimens will be positively identified by H.E. Moore of Cornell University, and various species sent to the Bailey Hortorium at Cornell and the Museum of Natural History in Lima.

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BOOKS

Ancient Ecuador: Culture, Clay and Creativity, 3000-300 B.C.

Donald Lathrap, Donald Collier, and Helen Chandra. Catalogue of an Exhibit Organized by the Field Museum of Natural History, April 18 - August 5, 1975. Chicago: Field Museum of Natural History, 1975. 110 pp., drawings, figures, maps, photographs, color plates, bibliography, catalogue of the exhibit. US$5.95 (paper). (Introduction and Conclusions in Spanish and English).

Lathrap, Collier, and Chandra's volume provides the archaeologist, the Latin American specialist or anyone interested in New World or Pre-Columbian Art with a well organized, well illustrated account of the development of early cultures in Ecuador. The book was written to coincide with an exhibit of artifacts, primarily ceramics, that were shown in various cities in the United States.

The text by Lathrap, a leading expert on the matter, is written so the non-archaeologist can read it without being baffled by scientific jargon. New interpretations of the archaeological data make it particularly valuable to both Andean and New World specialists. Following an introduction about the exhibit, Lathrap divides the subject matter into sections dealing with cultural chronological periods (ca. 3000-300 B.C.), early subsistence economies, including the origin of and dependence on agriculture, the early Ecuadorian ceramic tradition and how it reflects changing socio-cultural developmental patterns in the region, and finally a comparative statement on the relationships between ancient Ecuador and early Mesoamerican and Peruvian cultures.

The text is followed by a "Catologue of the Exhibit", compiled by Collier and Chandra, showing a wide variety of well illustrated ceramics from various archeological sites. Adequate photographs of these samples provide details on some hard-to-illustrate effigy censors. Methods of decoration, types of designs, paste composition, surface finish and form are all briefly given in Spanish and English.

The book is an important up-to-date contribution to both Ecuadorian and New World archeology. Not only does it provide a visual account of the development of early civilizations as seen primarily through ceramics but it also poses questions and offers many new ideas on the difficult problem of the earliest ceramics known to date in the New World.

Tom D. Dillehay

Medicine for Mountaineering

James Wilkerson, M.D., Editor
Revised Edition 1975 — 365p. il.
From: The Mountaineers, 719 Pike Street
Seattle, Washington 98111.

"The first detailed exposition published in America of what to do **after** first aid and **before** the doctor comes — which may be a long period of time on expeditions".

This book assumes that you may be days or even weeks away from professional medical help, and although the material covered slants to problems encountered by mountaineers, just about everything is applicable to general first and "second aid" emergencies. Several of my whitewater friends use this pocketbook as their sole medical reference.

The book was designed for two purposes: as a "text for a course in medicine for mountaineers taught by physicians" and as a reference during treatment. Here life-saving medical information is entrusted to the layman which until recently has been traditionally guarded by most doctors. Dr. Wilkerson should be cited for his efforts to keep terms plainly defined and make even difficult procedures understandable.

The second edition has been expanded by some fifty pages to accomodate updating on cardiopulmonary resuscitation, adding in the how-to's of tracheostomy, and more information on high altitude complications, hypothermia, venereal and gynecological problems, and new antibiotic therapy recommendations. Back sections on medications and procedures (I.V. therapy, injections, suction, etc.) are excellent.

Be sure to read this book cover to cover before your next expedition. This, aside from making you familiar with various medical problems, will tune you in to some interesting cautionary measures not included in the chapter on preventative medicine: e.g. why it is advisable for women to discontinue oral contraceptives several weeks before and during a prolonged stay at altitudes above 12,000 feet. **Marge Aagaard, R. N.**

DOWN TO EARTH

Ann Kendall, an English archaeologist, has just begun a five-year project in Cusichaca, located between Machu Picchu and Ollantaytambo in Peru's lower Urubamba Valley. She will lead a group of eight archaeologists who will spend five consecutive summers (June-September) excavating Cusichaca to reconstruct a picture of the life of the local inhabitants and the relationship between Cuzco and Machu Picchu.

She has recently completed a joint project with BBC Horizon. The result: a film documentary on Inca achievements which dispel popular myths that extraterrestrial beings helped Inca engineers build their temples. The Horizon team, which has also been filming the Nazca lines, is headed by Graham Massey. The film is called **The Myth of the Ancient Astronauts** and will include an interview with Erich von Daniken.

WANNA DEAL IN SOME GOOD SOUTH AMERICAN STUFF?

We're looking for Campus reps and retail store outlets to take orders for the **South American Explorer.** For info on a minimal risk dealership and how to become a rep for the **South American Explorer,** write us (airmail) in Lima: The South American Explorers Club
Casilla 3714
Lima 100, Peru

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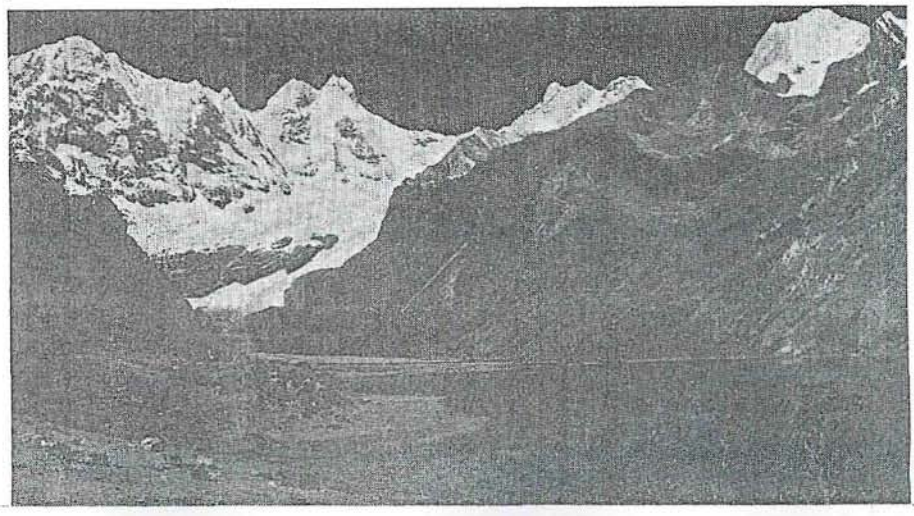

Letters

Dear Sirs:

Be so kind as to answer a frivolous question. Has anyone ever tried to transplant penguins from the Antarctic to the Arctic? And has it ever been noted that penguins are good to eat?

Jody Sheild
New York

Penguins remain unreconstructed Southerners, although there seems to be no reason why they should not be happy in certain spots in the Arctic. Gourmets have not commented on cooked or otherwise prepared penguin, but early explorers, suffering from hunger, reported that it tastes like something between beef and wild duck when stewed with stale fish and served with cod-liver oil.

Dear Editor:

I am very pleased to learn of the creation of the South American Explorers Club. There is great potential for such an organization, and I wish you the best of luck.

Enclosed is a check for $10.00 U.S. for a one year subscription to the magazine. Later, if the quality of the magazine justifies it, I will join the club . . .

In reading "Making a Balsa Raft" there is reference to White-skinned, blue-eyed Indians in Amazonia. I have visited such Indians in the Rio Ene region of eastern Peru. Hopefully, someone will do a report on them sometime.

In any event, I hope to eventually join the club and possibly submit some articles.

With best wishes,
William Denevan
Professor of Geography
University of Wisconsin
Madison, Wisconsin

Dear Sirs,

We are pleased to approve membership in ETI for the South American Explorers' Club on a reciprocal basis for 1977.

We also will be pleased to receive requests for scholarship aid for 1978, from qualified people willing to take secondary school age students into the field as assistants.

Very truly yours,
R. Enright
Expedition Training Institute

Gentlemen—

I just read of your Explorers Club in the paper, and I'd like to join. I have yet to set foot in South America but I will soon be on the way.

I'm an architect/writer and a former Peace Corps volunteer in West Africa. I've done enough Land-Rovering in Africa to know how valuable and scarce good travel information is. I don't mean where to buy suntan lotion and toilet paper or where to go for a real American hamburger. I mean information for someone seriously interested in the geography, ethnology, and archaeology of South America. What you're trying to do is a great idea, especially the magazine. I hope it works.

I am enclosing a check for US$25.00 and the newspaper article from UPI in case you haven't seen it. If I can be of any help to you up here, let me know.

Yours truly,
Richard Barnhardt
Woodberry Forest, Virginia

P.S. I hope word of your club gets to New Zealand. Kiwis are the greatest explorers I know of and the best travel companions.

Dear Sirs:

I am writing both for myself and our school to request a copy of your magazine.

I've been down to South America in 1974, climbing and travelling. This year I will be leading two groups of men over thirty on volcano-climbing trips to Ecuador; furthermore, our school is considering making this a yearly event. In such a case, membership in your club would make sense.

Sincerely your,
Stephan B. Andrews
Colorado Outward Bound School

TOUR DIRECTORY

The South American Explorers Club is in the process of compiling information on the various organized tours and trips available in South America. We'd appreciate your help in filling our tour evaluation form below. This information will be used to guide those who seek our advice and recommendations.

This form applies to all types of commercial trips and tours in South America.

Confidential (to be detached and stored in confidential file) TRIP REPORT Nº_____ (for office use)

YOUR NAME _____

ADDRESS _____

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NATIONALITY _____ PROFESSION _____ AGE _____

TRIP REPORT Nº_____ (for office use)

NAME OF COMPANY _____

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TRIP DESTINATION, TITLE, OR NUMBER _____

TYPE OF TRIP _____

DATE STARTED _____ NUMBER OF DAYS IN THE FIELD _____

NUMBER OF GUIDES OR COMPANY EMPLOYEES _____

APPROXIMATE AGE RANGES _____ NUMBER OF PEOPLE ON TRIP _____ TO _____

PRICE (Please specify type of currency) _____

DOES THIS PRICE COVER:	YES	NO
AIRFARE TO SOUTH AMERICA . .	☐	☐
AIRFARE WITHIN SOUTH AMERICA	☐	☐
HOTELS	☐	☐
FOOD	☐	☐
DRINKS	☐	☐

IN GENERAL, DID THE TRIP LIVE UP TO ITS PROMOTIONAL CLAIMS? _____

WOULD YOU TAKE THE SAME TRIP AGAIN _____

WOULD YOU TAKE A TRIP ORGANIZED BY THE SAME COMPANY _____

ANY GENERAL OR SPECIFIC REMARKS ON SAFETY, LEADERSHIP, PRICE, ETC.

_____

Tips & Notes

JUNGLE PLANES

On your way to Iquitos, Bolognesi, or Tamanco? The following is the most recent schedule and price information gathered by one of our members, Kathy Booler.

The TANS (Transportes Aéreos Nacionales de la Selva) office is in the Cine Rex Building in Pucallpa, Perú. Their float planes leave nearby from Yarinacocha, but there is no office there. They offer two types of service,— Trans Flota (float planes), and Acción Cívica (wheel planes). Their schedule runs like this:

TANS - FLOTA

Day	Destination	Seats available	Price (Soles)
Tuesday	Iquitos	1	S/. 1,990
	Requena	3	,, 1,170
	Bretaña	3	,, 1,550
	Tamanco	3	,, 1,310
	Pedero	3	,, 1,120
	Contamana	6	,, 510
Friday	Iquitos	1	,, 1,990
	Requena	3	,, 1,770
	F.D. Punga	3	,, 800
	Lisboa	3	,, 580
	Orellana	3	,, 390
	Contamana	3	,, 260
Monday	Atalaya	7	,, 1,140
	Miaria	6	,, 1,550
Thursday	Bolognesi	6	,, 820
	Atalaya	7	,, 1,140

ACCION CIVICA

Flight 02	Sepa	12	,, 844
2nd & 4th Friday each month	Manu	2	,, 1,542
	Maldonado	8	,, 1,776
Flight 12-A Every Sunday	Iquitos	28	,, 1,400
Flight 03 1st & 3rd Fridays	Sepa	20	,, 844
	Sepahua	8	,, 992
Flight 03-A Every Sunday	Esperanza	22	,, 1,256
Flight 03-A 1st & 3rd Fridays	P. Hermosa	8	,, 446
	Iquitos	20	,, 1,400

SASSA services San Ramón, Satipo and Pucallpa. Sr. Solsol is their representative in Pucallpa, with an office at the airport and Calle 9 de Diciembre Nº 558, Tel. 6872. The hours are 8-12, and 2-5.30. They have two twin-engine planes which can be chartered at the following rates:

1 hour — S/. 5,000 for 3 people
,, ,, — ,, 7,500 ,, 5 ,,
,, ,, — ,, 12,500 ,, 8 ,,

Aero Flota is headquartered in Yarinacocha. They have a Cessna 185, with a seating capacity of four. Charter flights anywhere are S/.5,000 per hour. On Tuesday, Thursday and Sunday, they leave for Contamana at 10 a.m. The cost one-way is S/. 1,075. They also have an office in Pto. Maldonado.

UP POLISH ROUTE

IN DECEMBER of this year, a group of Americans affiliated with Genet Expeditions will attempt an ascent of Mt. Aconcagua, the highest summit in the Western Hemisphere (6,919 meters). The expedition will scale the difficult route of the 1934 Polish team, over the rugged Polish Glacier to the storm-blasted summit.

Interested mountaineers must have high altitude climbing experience and good snow and ice background. For more information write: Genet Expedition, Talkeetna, Alaska 99676.

JUNGLE BOOTS

DO YOU love your feet? Then take care of them. One thing you don't need in the jungle, or anywhere else for that matter, is problems with your feet.

The best thing to keep feet healthy are a pair of US Army surplus jungle boots. They are leather oxfords with canvas tops reaching a few inches above the ankle. The soles are rugged and tough.

These boots are **not** waterproof. Waterproofing is the last thing you want in wet tropical areas. At the instep there are two small holes that allow the water, which inevitably seeps in, to drain back out. These boots are especially good in situations where the feet are constantly getting wet, such as on rafting trips, hiking along a stream bed, caving, or tramping anywhere near water. Unlike sneakers, the most common footware for these conditions, jungle boots don't rot, provide better foot support, and won't slip when wet.

Army jungle boots are available at most large Army-Navy surplus stores in the United States for under US$20. Or mail order from Army-Navy Surplus, 524 W. Main Street, Alhambra, California 91801.

MEDICAL DIRECTORY

Members! When you stop by the club, be sure to pick up free of charge the current 1977 listing of English-speaking physicians in South America, approved by the International Association for Assistance to Travellers. Or write: IAMAT, 350 5th Ave., New York, NY, 10001, USA.

SOURCES OF ANTIVENIN

Argentina	— Instituto Nacional de Microbiología Velez Sarfield 563, Buenos Aires
Brazil	— Instituto Butantan Caixa Postal 65, Sao Paulo
Colombia	— Instituto Nacional de Salud Calle 57, Número 8-35, Bogotá, D.E.
México	— Instituto Nacional de Higiene Czda. M. Escobedo Nº 20, México 13, D.F. Laboratorios MYN, S.A. Av. Coyoacán 1707, México 12, D.F.
Perú	— Departamento de Animales Venenosos Edgardo Rebagliatti 561 Jesús María, Lima
United States	— Wyeth Laboratorioes, Inc. Box 8299, Philadelphia, PA 19101

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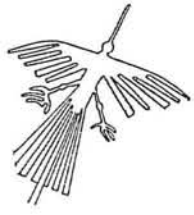

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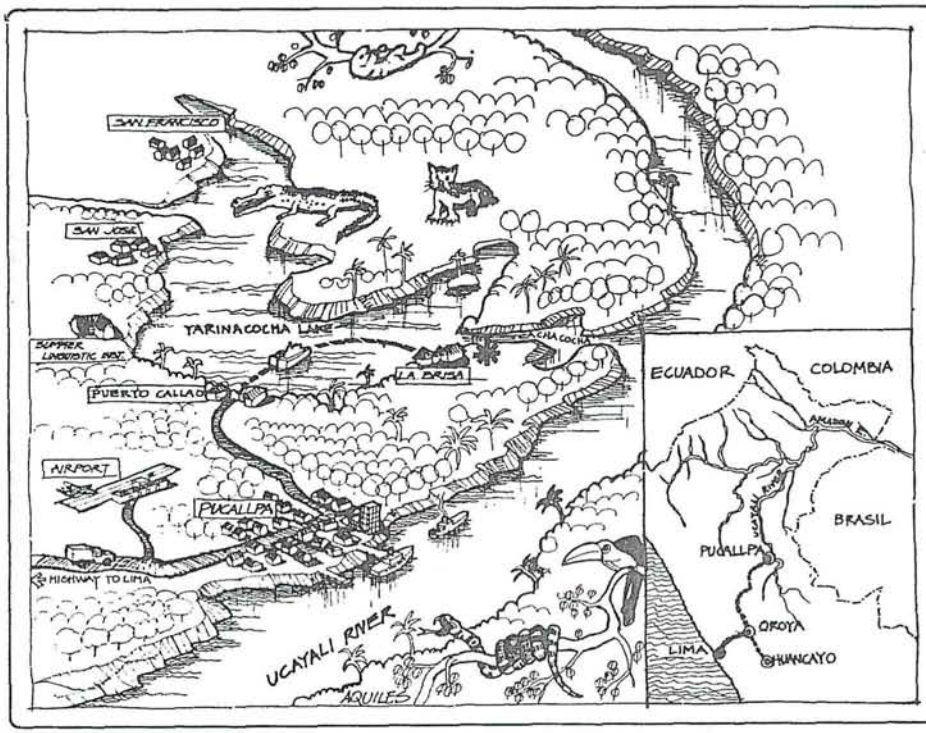

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La Brisa is located in the heart of Peru's Amazon Jungle near the Ucayali River — just five miles from the city of Pucallpa on Lake Yarinacocha. La Brisa offers:

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MALE 25, experience in whitewater, sailing, caving, backpacking, climbing. Speaks Spanish. Knows Peru well. Interested in any sort of adventure or guide work. Write F.F. Cahill c/o Explorers' Club.

PLANNING car trip from Columbia to Argentina. Looking for people to share expenses. Contact Paul Wong, No. 9 Grande Paseo, San Rafael, CA, USA.

NURSE with jungle living experience and degree in anthropology looking for expedition opportunity. Contact Sue Wineberg, c/o Explorers' Club.

RESEARCH team needs photos of avalanches. Send to Prof. Robert March, Physics Dept., U. of Wisconsin, Madison, WI 53706.

TEACHER interested in volunteering as biological field research assistant. Write: Diana J. Burton, 213, Westbrook Ave., Margate, Kent, England.

INTERESTED IN researching various parameters of South American ecosphere: Have BA degree in zoology, lab and field experience outside the university. Maja Eaton, 115 E. Gilman, Apt. J. Madison, Wis., 53703.

PROFESSIONAL geographer with extensive work in surveying, statistics, map and photo interpretation looking for expedition opportunities. Recently completed work in California's White Mts. on diffusion of the Bristlecone Pine. Write: Frederich Arn Hansson, 14616 West Park Ave., Boulder Creek, CA, 94403, USA.

SOL Y LUNA — Lodge in exotic jungle. Situated on isolated black water lagoon. Inquires to: Tom Eulberg/Armando Alva, 567 Loreto Ave., Iquitos, Peru, or 7119 Melrose Ave., Los Angeles, CA 90046, USA.

FOR RENT — "Río Blanco" acclimatization house. Accommodates 20-25 mountaineers at altitude of 3,000 meters. Two hours by car from Lima via Central Highway on way to Ticlio. Contact: Percy Tapia, Club Andino, Jr. Apurímac 224, office 409, Lima 100, Peru or tel. 282772.

MUD, jungle, and adventure. Check with us for exploration by Jeep in the Darien. Isthmian 4-wheeler Club, Box 785, Balboa, Canal Zone, Panama.

NEED an Amazon guide? I'm the best with over 30 years of experience. Kurt Gluck, C.P. 361, Manaus, Brasil.

DRIVING or shipping your car to South America? I need assistance in getting an electric winch. Please write R.T. Sprockel, Weg Fuik 70, Curacao, Netherland Antilles.

I NEED good recipes for peanut butter and other peanut dishes. I'm a transplanted Southern peanut farmer. Bobby Newton, Lista de Correos, Santa Elena, Estado de Bolívar, Venezuela.

FORESTRY student with knowledge of Spanish looking for field research expedition opportunities. Previous field work experience. Write: F.R. Claxon, West Coullie, Udny, Ellon, Aberdeenshire, Scotland AB4 OSR.

Amazon Expedition

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Erie, PA 16508 USA

or write c/o South American Explorers Club

CAVING LITERATURE ON SOUTH AMERICA

Imperial College Expedition to the Karst of Peru, 34pp., 4 double page survey and 3 surveys in rear pocket. 5 surveys in text, 11 plates, maps, geological and topographical. From J1. B.S.A. (52) Nov. 1973. US$4.00 post free **The Caves of Peru** and **Gruta San Pedro - A Cave in Bolivia,** both by Andrew Pavey, both in the British Caver, Vol. 64 Aug. 1976. US$2.00 post paid.

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EXPEDITION DIRECTORY

The South American Explorers Club is in the process of compiling an Expedition Directory. All outfitters, guides, and research programs are invited to send information concerning trips or activities to:

THE SOUTH AMERICAN EXPLORERS CLUB
Special Projects Committee
Casilla 3714 — Lima 100, Peru

"No Comment"

COLOMBIAN CANNIBALS REVEALED

(AFP) THE BODIES of drug traffickers and juvenile delinquents are used to nourish a tribe of Indians that organize macabre banquets of decayed flesh in an outlying region of Colombia.

These victims are lured to their death by offers of low cost cocaine. The murder of the victims is routinely efficient — under false pretenses the unsuspecting are attracted to the village, plied with alcohol, and then stabbed or shot in the middle of the night... Once the victims' screams have subsided, the bodies are buried. In sinister ceremonies, the bodies are dug up later on and eaten, the perpetrators caring little about their state of decay...

Investigators sent to the scene have found the remains of some twenty bodies, and the search is not over.

DWARF TRIBE

Bogota, (AFP) — The existence of a small town of semi-civilized dwarfs living in Yova, a rugged mountainous region of the Molitones on the Colombian-Venezuelan border, was disclosed here by a group of local journalists.

The Yukos, as they are called, have been mentioned in past anthropological studies made by the two countries, however today's revelation offers more useful and suggestive details than were previously available. For example: the journalists, from the weekly CROMOS, who visited the remote area, observed characteristics that imply mongolian origin; solid structure, wrinkled skin, dark chestnut eyes, and straight hair. The nose is compact and wide, cheekbones protrude, and their hands are quite large in contrast to their 0.9 to 1.2 meter stature. The Yukos also have muscular arms and legs, strong teeth, and heavy eyelids with mongoloid folds.

The reporters also observed that the women, who are outnumbered by the men and change owners in fights to the death, display their distinguishing scars on the upper body and forehead with pride, almost as if they were jewelry. These scars are earned in an ancestral rite called "fulfillment". The dwarf, drunk, hits her with an ornate club. Thus, she is spoken for.

To control the population, a primitive form of birth control is practised. The woman drinks a drug made from the bark of the **piyaya** plant ten times and, thereby, becomes sterile. The men smoke an herb called **manacachafa** which is suspected to be hallucinogenic.

The Yukos, who are friendly but terribly lazy, arrogant and decisive, subsist mainly on unsalted, raw or badly cooked corn and occasionally beans. When hunting is successful, the meat is not eaten fresh but only after it begins to rot.

The enemies of the Yukos, apart from the colonists are, the Sokomba, also dwarfs, living in a neighboring region.

With visitors, the Yukos understand Spanish in monosyllables and very short phrases. They know of no supreme being and distrust whites. The community lacks any form of government, and when a government capable of helping them is mentioned, they respond with a prolonged and malicious silence.

CITY OF GOLD

A TEAM of foreign doctors claims to have discovered a tribe of Indians who work a gold mine and have temples full of gold, silver and precious stones in the jungle borders of Peru, Brazil, and Colombia.

The tribe, which the team has baptised the Niawa, is estimated to have had between 50,000 to 80,000 members in its heyday which goes back some four thousand years. They are said to be copper-coloured and between 1.75 and 1.80 meters tall.

Dr. Louis Vanleer, a French surgeon in charge of building a hospital on the Brazilian border with Peru, says that the team visited the tribe for the first time last November.

He says that they hold 50 prisoners who work the gold mine inside of which an underground village has been built. Half the gold goes to the gods and the other half to the Niawa. He says that the precious stones are considered sacred, and that he does not know where they are found.

Dr. Vanleer says he can bring 10 members of the tribe to Lima in November when he will also show films and slides.

The other members of the team are Dr. Vander Kin of Swiss nationality; Rodolfo Ackerman, German; John Robertson, American; and Giovani Luis, Italian.

(The Lima Times - August 12, 1977)

ABOMINABLE JUNGLEMAN OF THE AMAZON

MORE THAN piranhas, snakes, tigers, and malaria, the natives of the northern Amazon fear the man-eating Mapinuari. Standing anywhere from 6 to 10 feet tall (depending on the region), this dreaded animal closely resembles a large red, hairy gorilla. Its protruding canine teeth are almost as prominent as were those of the extinct saber toothed tiger. Its large, powerfully clawed hands allow it to tear into houses with ease and rip the inhabitants in two. Thus far, arrows and bullets have proved ineffective in stopping the Mapinguari except for a direct hit in the navel.

(Source: Guidebook to Manaus by Carlos Binda)

NO WASHING, RUBBISH, OR DUCKS ALLOWED

CUZCO — The authorities of Urcos, capital of Quispicanchi, have absolutely forbidden people to use the water of the lake for washing clothes, or to throw rubbish into it, in order to avoid its contamination.

The Lake of Urcos will be stocked with six thousand trout fingerlings, and to prevent their being eaten, the duck population will be exterminated.

(El Comercio, Lima)

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SOLAR ECLIPSE IN COLOMBIA

A TOTAL eclipse of the sun will occur in central Colombia on the 12th of October. Weather permitting, it will be observable in Bogotá and the eastern cordillera of the Andes. Amateur Astronomers, Inc., an organization based in New Jersey, is sponsoring an expedition to Colombia to photograph the event. They will set up camp in the small town of Aguazul, 200 kilometers northeast of Bogotá. Aguazul lies on the western rim of the **llanos** (grass covered plains) in eastern Colombia. The dry, clear air of this region is good for astrophotography.

A TSCHIF OF PLANS

ON A STEEP and treacherous trail in the Bolivian highlands, where one slip can mean disaster, rode a solitary man. Thirty-four year old Gordon Roddick from Littlehampton, England, was eight months into the historic 10,000 mile Buenos Aires to Washington, D.C. trek, completed in 1927 by A.F. Tschiffely and never since reenacted.

After successfully negotiating the jungle swamps and lowlands of Argentina and Paraguay, Roddick's mount, a Patagonian creole, bolted on a lofty Bolivian mountain pass near La Paz and tumbled to its death. Roddick escaped unscathed.

Christopher Portway, the 53 year old explorer and writer who was to have joined Roddick later in the trip, and David Taylor, a 23 year old student of Inca culture, have taken up the epic journey, slightly modified. The two left Cusco, Peru in April of this year. Following the 500 year old Central Andean Inca Road, they plan to complete the 1,900 kilometer trek to Quito in less than eighteen months.

"Though most of the expedition will be accomplished on foot," commented Portway with a smile, "over some of the less interesting portions, we will not hesitate to accept rides from passing trucks, or even horses. The horses however, will be inspected for sure-footedness."

On June 21st, an exhausted but triumphant pair arrived in Cajamarca, the site of the Inca Atahualpa's captivity and the famous ransom room. They had followed the Inca Military Road that Atahualpa used to conquer the Cajamarca civilization between 1460 and 1470. Following a few days of well earned rest, Portway and Taylor left for Quito, Ecuador, on the last leg of the trek.

FLYING FRENCHMAN

POISED on the cold windswept and snow-covered 6,700 meter southern peak of Huascarán, a young Frenchman, Rene Ghilini waited for just the right conditions before starting out on what was to become a world altitude record for hang glider. He was airborne in his Delta Wing, "Icarus," for almost one hour, covering 20 kms. by the time he landed near the small town of Mitipampa, 44 kms. from Huaraz.

Ghilini, part of a three man and one woman climbing expedition, flew off the famous Inca capital of Machu Picchu some days later.

PRINCE HUNTING ENDANGERED SPECIES

The Shah of Iran's brother, Prince Abdorreza Pahlavi, applied for and received a permit to hunt two of Peru's endangered species. In the case of the nearly extinct spectacled bear (Tremarctos ornatus), His Royal Highness was fortunately unsuccessful. A taruca, a rare northern Andean deer on Peru's "protected" list, was not, however, so lucky.

The taruca is also listed in the Red Data Book, the international list issued by the Survival Service Commission of the International Union for Conservation of Nature and Natural Resources (IUNC). The prince's insistance on going ahead with the planned hunt has caused outrage among conservationists worldwide and assurances from airlines that they would abide by an international agreement which prohibits them from carrying the pelt of an endangered species.

The Prince, when asked why he did not accept an alternative goodwill offer to take a live pair of spectacled bears for Iran's zoo in Teheran, replied, "We have not got the time".

JOINT II

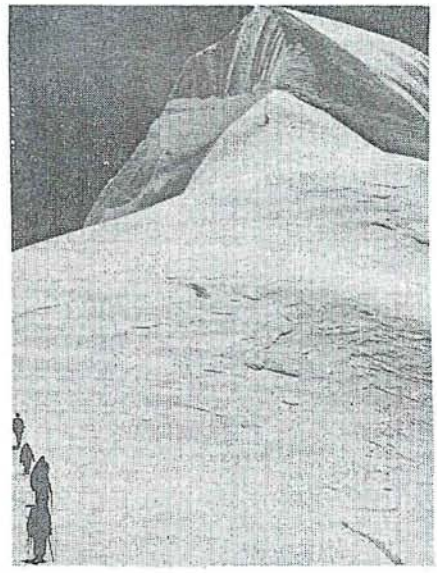
JOINT II, the massive costal upwelling study sponsored by the National Science Foundation and Peru's Instituto del Mar, has temporarily left the west coast of South America.

Five research vessels, one aircraft, and scientists from over twelve unversities participated in the sixteen month study along 200 kms. of Peru's coast, some of the richest fishing grounds in the world.

These waters owe their fish-producing powers to a process called coastal upwelling, a phenomenon by which nutrient rich bottom waters are brought to the surface through the intricate interaction of winds, currents, and the earths rotation. These rich waters nourish one-celled plants called phytoplankton, the basis of a complex food chain.

In 1970, Peru's coastal waters yielded 12.3 million tons of anchovies (22% of the world's total fish catch). Two years later, El Niño, a warm onshore breeze that upsets the delicate mechanism by which upwelling is sustained, brought about a catastrophic reduction in the fish population, as indicated by a catch of only 4.5 million tons. According to Joint II researchers, this problem was aggravated by unrestricted fishing.

The major aim of Joint II is to collect enough data on the mechanics of upwelling to enable scientists to forecast its variations. Armed with this information, intelligent fishing limits can be set, thereby avoiding the ecological havoc of overfishing.



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DUCK BILLS

R. Giuseppi Slater and Martin McDonnell, two Americans, left Lima recently for La Merced, a small pueblo on the Rio Placa, where they will begin the first leg of a 2½ month river trip through the jungles of southeastern Peru. From La Merced, they will make their way in a catamaran-type raft of their own design. Atalaya will be reached after a descent of the Rios Chanchamayo, Perene, and Tambo. Here the pair plans to turn upstream on the Urubamba and paddle, pole, and line their unique craft to the mouth of the Rio Sepahua. Their upstream progress on the Urubamba and the Sepahua, the next leg of the journey will, in part, be made feasible through the use of an unusual "duck bill" pole. From the source of the Rio Sepahua, or as near as they can get to it, the two explorers plan a portage to the Rio Jose Pardo, one of the major tributaries of the Madre de Dios river system. After a downriver trip of one to two weeks, they hope to reach Puerto Maldonado.

Giuseppi stopped by the South American Explorers' Club to show other members how the "duck bill" works. These poles are designed for use in mud bottoms where a conventional pole would simply get stuck.

A LOOK AHEAD

Up-coming Articles in the South American Explorer:

Lost Cities of Chachapoyas	Jewish Gauchos
Nazca Lines — Maria Reiche Profile	Spectacled Bear (Field Report)
Ancient Natural Dyes	Making Contact — Machiguenga Indian Photo Essay
Surinam River Adventures	Physical Adaptations to High Altitude